A.I.A.—File No. 16e1

Fenestra

The Blue Book
of
Steel Windows

B. R. JOHNSON
145 HARDING PLACE
SYRACUSE, N. Y.
TEL. 4-7940

Detroit Steel Products Company
2250 East Grand Boulevard
Detroit, Michigan
1928

A.I.A.—File No. 16e1

B. R. JOHNSON
145 HARDING PLACE
SYRACUSE, N. Y.
TEL. 4-7940

Fenestra Catalogue Index

	PAGE	PLATE
Experience and Facilities	1	.....
Scope of This Catalogue	1	.....
Fenestra Designing Service	1	.....
Fenestra Research Service	1	.....
Fenestra Erection Service	1	.....
General Information	1	.....

Residential Windows

A—Fenestra Casements

Specifications—Combinations	3	.....
Typical Cross Sections	4	A-101
Types and Sizes	5	A-102
Operating Hardware	6	.....
In Brick—Brick Veneer	7	A-103
In Concealed Wood Buck—Stone	8	A-104
In Tile—Stucco—Concrete	9	A-105
In Frame—Half Timber	10	A-106
Drip—Fins—Anchors	11	A-107
Screening and Shading Details	12	A-108
Screening and Shading Details	13	A-109
Fire Escape Details	14	A-110

B—Fenestra Casement Doors

Elevations and Details	15	B-101

C—Fenestra Utility Windows

Types—Sizes—Details	16	C-101

D—Fenestra Basement Windows

Specifications	16	.....
Types—Sizes—Details	17	D-101

Architectural Windows

G—Architectural Projected Windows

Specifications	18	.....
Operating Hardware	19	.....
Types and Sizes	20	G-101
Details—Combinations	21	G-102
In Concrete—Terra Cotta	22	G-103
In Brick, Ornamental Iron	23	G-104
Mullion Details	24	G-105
Shading Details	25	G-106
Screening Details	26	G-107
Underwriters' Windows	80	.....

GC—Commercial Projected Windows

Specifications	27	.....
Operating Hardware	27	.....
Types and Sizes	28	G-201
Details—Combinations	29	G-202
In Concrete—Brick	30	G-203
Screening Details	31	G-204
Shading Details	32	G-205
Underwriters' Windows	80	.....

H—Counterbalanced Windows

Specifications	33	.....
Types and Sizes—Details	34	H-101

I—Interior Corridor Windows

Specifications	35	.....
Types and Sizes—Details	35	I-101

Industrial Windows

L—Pivoted Windows

Specifications	36	.....
Prepared Openings	37	L-101
Types and Sizes	38	L-102
Standard Combinations	39	L-103
In Concrete—Brick—Tile	40	L-104
In Steel—Wood	41	L-105
Vertical Mullion Details	42	L-106
Horizontal Mullion Details	43	L-107
Operating Hardware	44	.....
Screening Details	45	L-108
Camber—Semi-circular Heads	46	L-109
Detention Windows	47	L-201
Vertically Pivoted Windows	48	L-301
Side Hung Windows	48	L-301
Horizontally Rolling Windows	49	L-401
Underwriters' Windows	80	.....

P—Continuous Top Hung Windows

Specifications	50	.....
Girt Punching	51	P-101
Typical Cross Sections	52	P-102
Details of Typical Units	53	P-103
Storm and End Panels	54	P-104

Mechanical Operating Devices

SA—Worm and Gear Operator

Specifications	55	.....
Typical Details	60	S-101
Bay Operation	61	S-102

SB—Rack and Pinion Operator

Specifications	55	.....
Typical Details	62	S-201
Electrically Controlled	63	S-202

SC—Screw Type Operator

Specifications	56	.....
Typical Details	64	S-301
Electrically Controlled	65	S-302

SD—Tension Operator

Specifications	57	.....
Typical Details	66	S-401
Electrically Controlled	67	S-402

SE—Continuous Operator

Specifications	58	.....
Typical Details	68	S-501
Lever Arm Assembly	69	S-502
Extension Bracket Details	70	S-503
Electrically Controlled	71	S-504
Cable Type Operator	72	S-505
Power and Auxiliary Power Operator	80	.....
Super-Power Operator	80	.....

SF—Electrical Equipment for Operators

Specifications	59	.....

Industrial Doors

V—Swinging and Sliding Doors

Specifications	73	.....
Types—Sizes—Handing	75	V-101
Swing Door Frames	75	V-101
Channel Type Doors	76	V-102
Tubular Type Doors	77	V-103
Special Door Designs	80	.....
Airplane Hangar Doors	80	.....

Industrial Partitions

Y—Interchangeable Partitions

Specifications	74	.....
Types and Sizes—Details	78	Y-101
Typical Cross Sections	79	Y-102

DETROIT STEEL PRODUCTS COMPANY

Manufacturers of Fenestra Steel Windows

2250 East Grand Boulevard, DETROIT, MICH.

(1) Experience and Facilities

Fenestra, the Latin word for "window," is also the registered trademark of the first steel window made in America. Since 1907, the DETROIT STEEL PRODUCTS COMPANY has manufactured these windows under exclusive patents covering the Fenestra joint, a process of interlocking steel bars in such a manner that strength increases at the point of intersection. The company has always enjoyed an exceptional reputation for financial soundness and is recognized as one of Michigan's strongest industrial concerns. Its product has been used on many of the largest structures in the United States. Besides the main plant covering 14½ acres in Detroit, branch plants are maintained at Oakland, California, and Toronto, Canada. The product is sold through 14 branch offices, direct agents in all the principal cities, dealers in towns of every size, and a world-wide export organization. Canadian sales are handled through the Canadian Metal Window and Steel Products Company, Ltd., of Toronto.

(2) Scope of This Catalogue

While the DETROIT STEEL PRODUCTS COMPANY is fully equipped to manufacture solid steel windows, doors, partitions and operators of every type and character, it is manifestly impossible to show in any catalogue the hundreds of special designs which this company can supply.

This catalogue, therefore, covers only such designs as have been accepted throughout the steel window industry and approved by the Department of the Interior as the stock and standard products normally used in building.

On individual operations where windows of special design are absolutely required, layouts and detail drawings are supplied without added cost.

To secure the most practical and economical window designs, we strongly recommend consultation with our branch offices and agents *at the time the building is designed.*

(3) Designing Service

To assist in the proper designing of steel windows for architectural structures, we maintain an Architectural Service Department composed of architects with special training in the correct use of Fenestra in all types of monumental buildings. A word to your local Fenestra representative will place this department at your disposal without charge or obligation, with either direct personal service in your own drafting room or through intelligent co-operation from headquarters in Detroit.

(4) Research Service

The daylighting and ventilating results, which may reasonably be expected from any given arrangement of windows, can now be predetermined with considerable accuracy through methods developed over a period of years by our Department of Engineering Research in conjunction with the Engineering Research Department of the University of Michigan. On major operations where the type and character of fenestration play an important part in the design of the building, we shall be glad to consider the special problems involved and give you the benefit of our research along these lines. No cost or obligation is involved as this service is rendered in the interest of better use of natural forces in the daylighting and ventilating of industrial structures.

(5) Erection Service

The FENESTRA CONSTRUCTION COMPANY, a subsidiary of the DETROIT STEEL PRODUCTS COMPANY, offers builders the service of an organization especially equipped and trained for the erection and field painting of Fenestra windows. *Under separate contract,* this company will assume complete responsibility for the delivery, handling, erection and painting of Fenestra products and will guarantee satisfaction from the time the material leaves the factory until it is installed in the building. Twelve erection supervisors and twenty-seven experienced field superintendents are constantly employed in this work all over the United States.

General Information—Read Carefully

(6) Nomenclature

Numbers designating various types of Fenestra Windows are translated as follows: first digit—number of lights in width; second digit—number of lights in height; third digit—number of ventilators or swing leaves; fourth digit—number of lights in each ventilator or leaf; fifth digit—number of lights between ventilator or swing leaf and the sill of the window. Thus a casement type 4528 indicates a unit 4 lights wide, five lights high with two 8-light swing leaves at the sill. A Horizontally Pivoted type 35161 indicates a unit 3 lights wide, 5 lights high with one 6-light ventilator 1 light above the sill.

(7) Dimensions

In all Fenestra except casements and basements, the window dimension is always equal to the clear opening. In other words, that part of the window frame which is embedded in the wall is not considered in the window dimensions. On casement windows the window opening dimension is ¼ in. larger than the window dimensions, for clearance. On basement windows dimensions are overall. See details.

(8) Stock Types

Stock types of Fenestra Windows—those types which are made up and carried in warehouses—are indicated in this book by solid outline drawings, *shaded.* Standard types—those types which are not made up but for which bars are already cut and in stock at Detroit—are shown in solid outline, *not shaded.* Listed Special Windows are shown in *broken* outline. Stock types are always preferable from the standpoint of economy and quick shipment. Standard types are next best.

(9) Installation

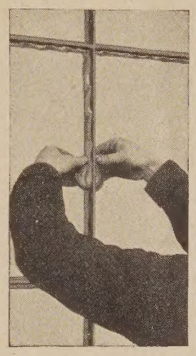
All window openings should be so designed that steel windows may be installed after the walls are up. This is the most economical, as well as the most practical method of erection and obviates many difficulties frequently

encountered when an attempt is made to set the windows as the building progresses. Rebates, clearances and angles as shown have been accepted as the best building practice and such details should be followed closely.

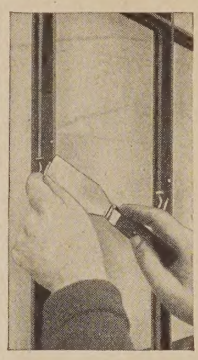
Steel windows are not structural members and under no circumstances should any portion of the building structure be allowed to rest on the windows.

(10) Glazing

Standard glass dimensions for horizontally pivoted units are: 12x18 in. and 14x20 in.; but glass in ventilators which abut on the top, sides or bottom of the ventilator must be trimmed 1 in. along the abutting edge. See accompanying diagram. It is desirable to cut glass full to the specified dimension.

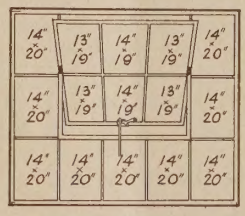


Bed Puttying



Inserting Glazing Clips

Casement and Architectural Projected glass sizes are indicated on the plates showing types and sizes of standard units.



Ordinarily, the DETROIT STEEL PRODUCTS COMPANY does not do glazing but any Fenestra representative can refer you to reputable concerns who make a specialty of glazing steel windows. A sufficient quantity of spring glazing clips accompanies every order of Fenestra windows, without added cost. After the windows have been bed puttied and glass inserted, the clips are used together with face putty to hold glass in place. On casement windows use two clips for each light. On horizontally pivoted windows use four clips for each fixed light, and six clips for each ventilator light.

Plate glass is desirable for casements though double strength clear glass may be used. The standard method of glazing architectural projected windows is with ¼ in. glass or double strength glass, held by glazing angles or glazing bead. On horizontally pivoted windows ¼ in. factory ribbed or wire glass or ⅛ in. ribbed, or double strength glass may be used.

(11) Putty

Wood sash putty never should be used with steel windows. Steel casement putty or any other high grade of steel window putty should be used, and is obtainable locally. Putty may be ordered from Fenestra dealers or from company warehouses in 25, 50 and 100 pound drums. Use ½ pound per square foot of glass area.

(12) Basement Windows

Fenestra Basement windows are sold exclusively through dealers. Thousands of dealers in all parts of the country carry them in stock for immediate delivery. Any responsible dealer can secure them by writing to the home office at Detroit.

(13) Lists and Schedules

We recommend that all steel windows, doors, partitions or operators be accurately listed and located either in schedules on plans or in specifications. If more than one type of the same product be desired, each type should be listed and located separately. In the case of mechanical operators, it should be clearly indicated whether the ventilators are to be operated from one or more stations and whether in single or in multiple runs. These details assure greater accuracy in estimates.

(14) Fillets to Increase Strength

Most of the bars used in the manufacture of Fenestra steel windows, doors and partitions, are of solid, open hearth steel, hot rolled to special Fenestra designs. All such bars are rolled with heavy fillets in all re-entrant angles. These fillets increase the strength and rigidity of the bars, making them much stronger than similar sections of pressed metal.

(15) Protection of Hardware

We strongly recommend that hardware be stored carefully in the original packages and that it be attached *only* after the windows, doors or partitions have been erected, glazed and painted.

(16) Galvanizing

Where specified at the time the order is taken, Fenestra Architectural and Industrial Windows can be supplied, hot galvanized. (Certain parts, such as glazing angles and side arms, electro-galvanized.) Mechanical operators may also be secured, galvanized, under the same conditions with the exception of powers which are painted with aluminum paint.

(A) STEEL CASEMENT WINDOWS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications

(A-1) Work Included

Note: List and locate. (See Paragraph 13, Fenestra Page 2.)

(A-2) General

Steel Casement Windows shall be *Fenestra* as manufactured by DETROIT STEEL PRODUCTS COMPANY.

(A-3) Material

(A-3a) Casement Sections—All sections shall be specially designed, hot rolled, solid steel casement bars with heavy fillets in all re-entrant angles.
All frame members and the stiles and rails of each swing leaf shall be rolled with a ⅛" baffle.
Muntins shall be T bars.
(A-3b) Mullions—All mullions shall be hot rolled, solid steel T bars.

Note: Use when two or more Casements are placed side by side or one above another in the same opening.

Note: Pressed metal or built up sections should not be used for either vertical or horizontal mullions.

(A-4) Construction

(A-4a) Frames and Swing Leaves—Frames and the stiles and rails of swing leaves shall be baffled Z bars mitered at all corners and electrically butt welded. All exposed faces at welds shall be ground to a smooth finish. Provide continuous, two-point, flat contact weathering between swing leaves and frame.
(A-4b) Muntins—Muntin bars shall be continuous from head to sill and from jamb to jamb, so interlocked as to increase the rigidity and strength at intersections. Joints at frames, stiles and rails shall be mortise and tenon, air hammer riveted.

Note: Intersections of casement window muntins are made substantially as described on Fenestra Page 44.

Note: Muntins may be omitted to permit glazing in single lights or leaded glass. If desired so specify. We do not supply leaded glass.

(A-4c) Vertical Mullions—Vertical mullions shall be 1⅜" deep. Provide bolts for frame attachment.

(A-4d) Horizontal Mullions—Horizontal mullions shall not be less than 2¼" deep with tip of protruding web bent downward to form a drip. They shall be continuous from jamb to jamb. Provide bolts for frame attachment.

(A-4e) Copper Head-Drip—Wherever swing leaves extend to head of frame, provide a continuous 20-gauge, cold rolled, copper drip.

Note: Copper drip is shipped unattached. See details Fenestra Page 11.

(A-4f) Jamb and Head Fins—

Note: We recommend that for all masonry construction jamb and head fins be specified to provide added anchorage and form wind stop. Where used, Casements must be built into the masonry work (not installed in prepared openings). See note (A-8). (See detail Fenestra Page 11.) Their added cost is warranted. If desired so specify. If not included specify that jamb and head anchor clips shall be furnished.

(A-4g) Sill and Jamb Anchor Clips—Furnish steel (sill) (jamb) anchor clips with bolts to attach to frame as required.

(A-5) Attached Hardware

Note: Attached at factory.

(A-5a) Side Hinges—All side hung swing leaves shall be hung on two (2) heavy, extension (cleaning) hinges of special, solid rolled, steel with heavy re-entrant angle fillets. Hinge pins (non-removable) shall be of solid bronze accurately fitted into flanged, bronze bushings.

Note: Bronze pins and bushings provide 100% bronze bearing at all moving points.

(A-5b) Top Hinges—Top hung swing leaves in transoms shall be hung on heavy steel hinges with bronze pins.

(A-5c) Locking Handle Brackets—Ornamental locking handle brackets shall be cut from special, solid rolled, steel sections and both riveted and welded to the swing leaf stiles.

(A-5d) Operator Provisions—Bottom rails of all side hung swing leaves shall be provided with tapped holes, standardized as to size and location to take any of the six types of casement operators.

Note: See (A-6c).

(A-5e) Strikes (for Side Hung Swing Leaves)—Provide bronze strike plates attached to frames.

(A-6) Detached Hardware

Note: See Fenestra Page 6.

(A-6a) All detached hardware shall be shipped carefully packed to prevent damage until applied for use.

(A-6b) Locking Handles (for Side Hung Swing Leaves)—Ornamental locking handles, so designed as to produce a cam action, shall be:

(1) Handle 198 (malleable iron with dull black, rust-resisting finish) (dark oxidized bronze).

(2) Handle 699 (dark oxidized bronze).

Note: Select as to design and material. No. 699 at slight added cost over No. 198. Bronze at added cost over iron.

Handles shall be attached to handle brackets with bronze hexagonal headed bolts tap-screwed into steel, spring, friction clevices.

Note: Clevice assures constant and even tension which prevents handle from becoming loose.

All handles at latch shall be provided with notched heads to permit restricted ventilation.

(A-6c) Operators (for Side Hung Swing Leaves)—

Note: Select as required.

Note: All casements are furnished with the "Standard" operator. Where desired, any of the types listed "Optional" may be substituted at a reasonable added cost.

(1) *Standard:* Sliding Stay (malleable iron with dull black rust-resisting finish).

(2) *Standard:* Peg and Stay (bronze peg, malleable iron stay with dull black rust-resisting finish, stay plate and stay bracket).

Note: In oxidized bronze for both 1 and 2 Standards at slightly added cost.

(3) *Optional:* Thumb Screw Stay (malleable iron with dull black rust-resisting finish, oxidized bronze friction plate, guide and thumb screw).

(4) *Optional:* Gear Type Underscreen (malleable iron with black rust-resisting finish or oxidized bronze).

(5) *Optional:* Surface Type Underscreen (malleable iron with dull black rust-resisting finish).

Note: In oxidized bronze at slightly added cost.

(6) *Optional:* Flush Type Underscreen (oxidized bronze).

(A-6d) Operator (for Top Hung Transom Sash)—

(1) *Standard:* Peg and Stay (malleable iron with dull black rust-resisting finish).

SYMMETRICAL COMBINED WIDTHS

Standard widths	Units wide	Panes wide	Panes wide per unit	Vert. mull.
1 ft. 7⅜ in.....	1	2	2	0
3 ft. 1½ in.....	1	4	4	0
3 ft. 2⅞ in.....	2	4	2, 2	1
4 ft. 7½ in.....	1	6	6	0
4 ft. 10⅜ in.....	3	6	2, 2, 2	2
6 ft. 3⅛ in.....	2	8	4, 4	1
6 ft. 4½ in.....	3	8	2, 4, 2	2
6 ft. 5⅞ in.....	4	8	2, 2, 2, 2	3
7 ft. 10½ in.....	3	10	2, 6, 2	2
7 ft. 10⅝ in.....	3	10	4, 2, 4	2
8 ft. 1⅜ in.....	5	10	2, 2, 2, 2, 2	4

Use these widths with any heights.

(A-7) Mastic

The Casement Manufacturer shall furnish a sufficient quantity (one pound to ten lineal feet) of mastic to form a weathertight frame bed, at head, jambs and sill (and mullions).

(A-8) Erection

Note: In brick masonry construction wherever casements are built into the brickwork (not in prepared openings) without wood bucks, include in the masonry specification a clause that the mason shall use every precaution against springing or racking the casements out of shape.

Note: Where desired, the Fenestra Construction Co., *under a separate contract will erect Casements windows in prepared openings. (See Paragraph 5, Fenestra Page 1.) If required so specify.*

(A-8a) All casement windows shall be set plub and true, properly aligned and securely anchored before glazing.

(A-8b) All mullions shall be rigidly bolted to frames.

(A-8c) Set all frames in mastic neatly applied in a narrow beading where they come in contact with the building construction (or steel mullions). Use one pound of mastic to 10 lineal feet.

(A-8d) Apply all hardware in accordance with the manufacturer's directions.

Note: Give second coat of paint and glaze before applying finish hardware.

(A-9) Painting

All casement windows shall be given one dip-coat of grey lead and oil paint by the manufacturer before shipment.

Note: The following should be provided for in the painting specifications:

Note: One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.

(A-10) Glass and Glazing

Note: The following should be included in the Glazing Specifications:

Note: See Paragraph 10, Fenestra Page 2.

(A-10a) Glass—Glass shall be (¼" thick plate) (double strength).

Note: Single strength glass is not recommended.

(A-10b) Putty—Putty shall be Fenestra Steel Casement Putty.

Note: This is a special, high-grade, steel window putty which assures quick setting. Ordinary wood sash putty must not be used. See Paragraph 11, Fenestra Page 2.

(A-10c) Glazing—All casement windows shall be glazed from the outside. All glass shall be set in a bed of putty and secured by copper plated, steel, spring glazing clips furnished by the Casement Manufacturer. Face putty shall be applied in a neat, clean-cut, smooth manner.

Note: Do not paint until putty has thoroughly hardened. See Paragraph (A-9).

(A-11) Provisions for Screens

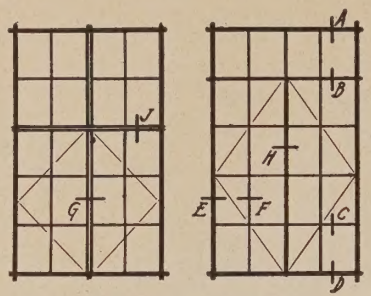
Note: Fenestra Pages 12 and 13 give suggestions for screening provisions. Include in the Carpentry Specifications, the necessary clauses covering stops and wood trim Space between screen and casement frame must not be less than 2⅛".

(A-12) Screens

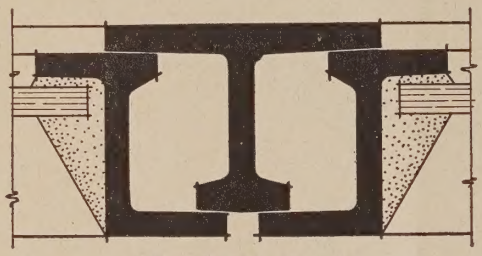
Note: Metal or wood screens, sliding, hinged or rolling may be used as desired. Screens are not included by the Casement Manufacturer and should, therefore, be provided for under another division of the specification.

(A-13) Shade and Drapery Brackets

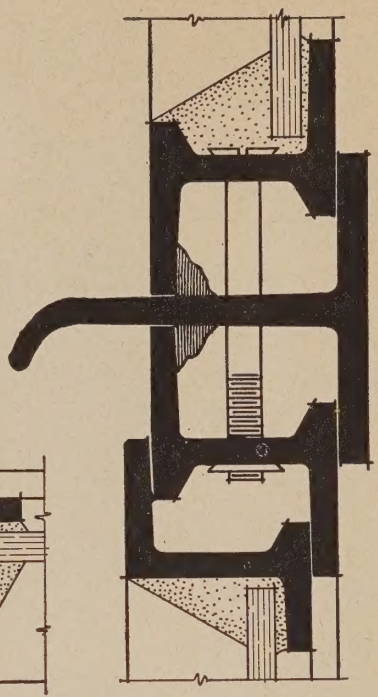
Note: Shade and drapery brackets are not attached to the steel casement frame and are, therefore, not provided by the Casement Manufacturer. Suggestive provisions are made in Fenestra Pages 12 and 13.



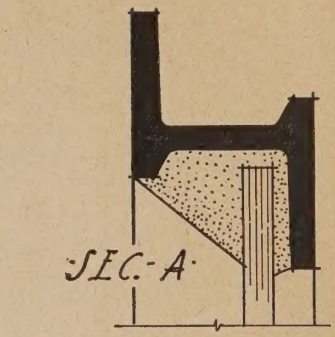
TYPICAL ELEVATIONS



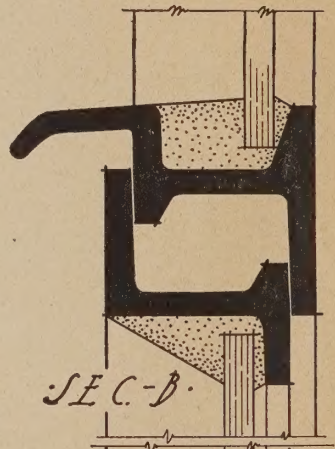
SECTION - H



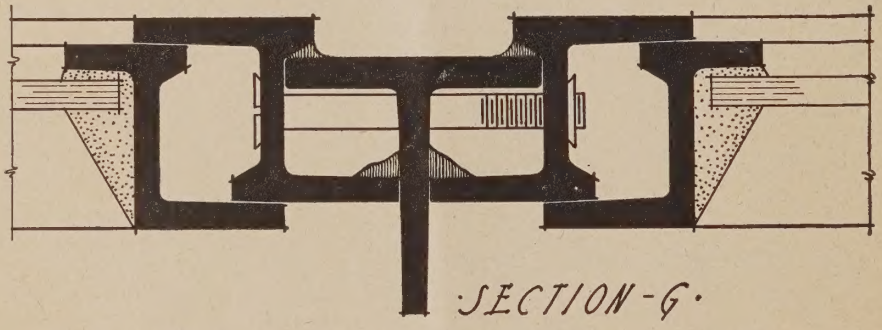
SECTION - J



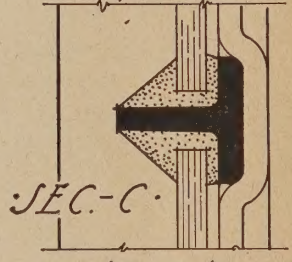
SEC. - A



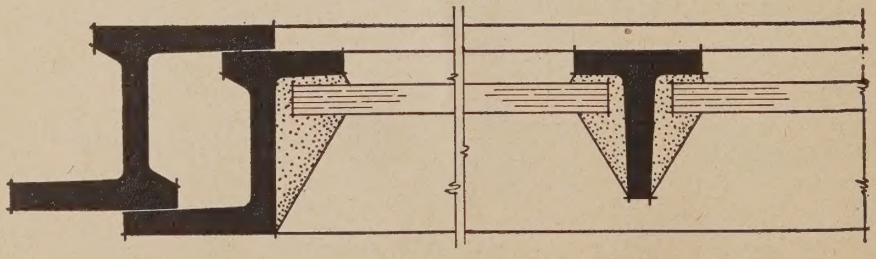
SEC - B



SECTION - G

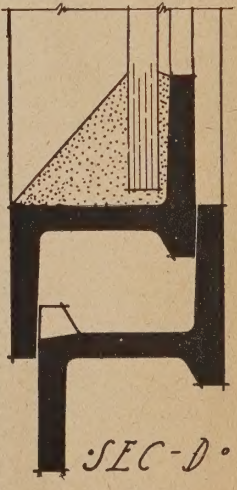


SEC. - C



SECTION - E

SECTION - F



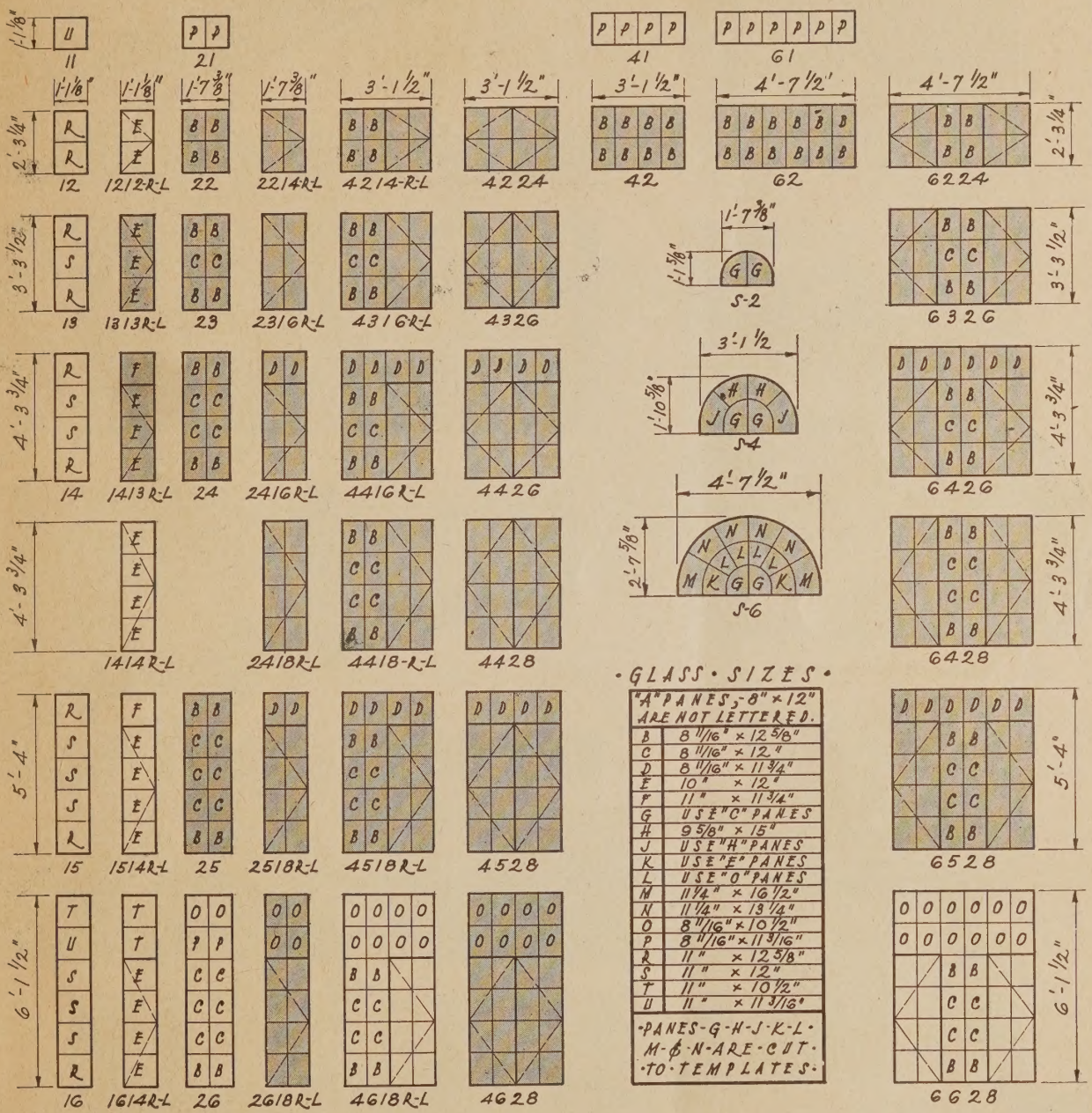
SEC - D

SCALE - FULL SIZE

Fenestra, *August 1927*	*Steel Casement Windows* *Typical Cross Sections*	**Plate No** *A-101*

STANDARD AND STOCK TYPES

STOCK TYPES SHOWN WITH SHADED BACKGROUND



GLASS SIZES

"A" PANES, 8" × 12" ARE NOT LETTERED.	
B	8 11/16" × 12 5/8"
C	8 11/16" × 12"
D	8 11/16" × 11 3/4"
E	10" × 12"
F	11" × 11 3/4"
G	USE "C" PANES
H	9 5/8" × 15"
J	USE "H" PANES
K	USE "E" PANES
L	USE "O" PANES
M	11 1/4" × 16 1/2"
N	11 1/4" × 13 1/4"
O	8 11/16" × 10 1/2"
P	8 11/16" × 11 3/16"
R	11" × 12 5/8"
S	11" × 12"
T	11" × 10 1/2"
U	11" × 11 3/16"

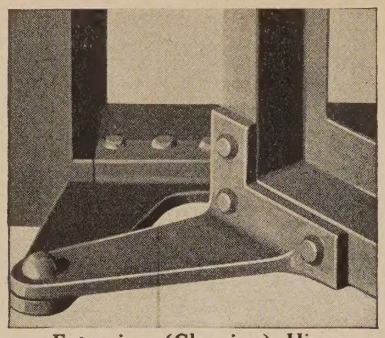
PANES G-H-J-K-L-M-Ø-N ARE CUT TO TEMPLATES

NOTE

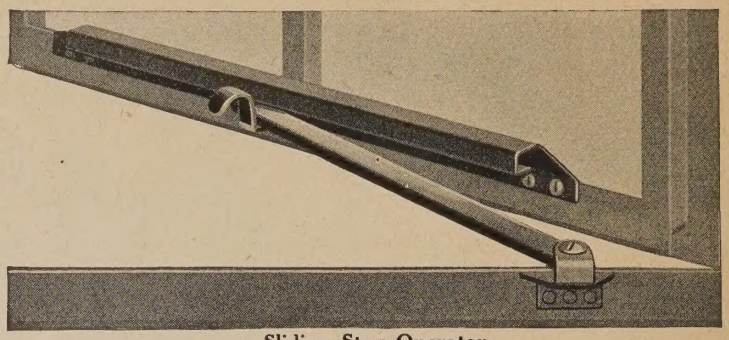
HANDING OF CASEMENTS IS DETERMINED BY THE HINGE LOCATION VIEWED FROM OUTSIDE. A HINGED AT RIGHT IS A RIGHT HAND CASEMENT; ETC.

TOP HUNG TRANSOMS

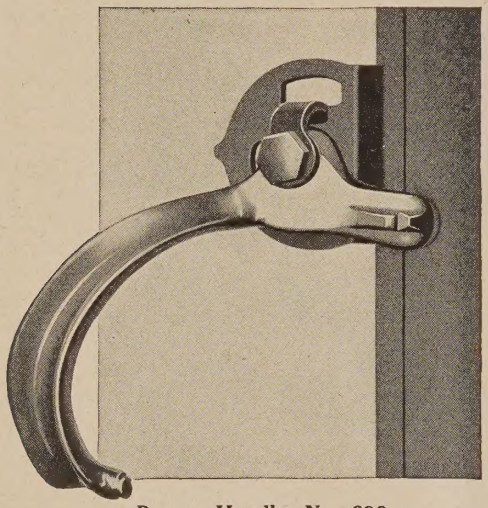
CASEMENT FITTINGS AND HARDWARE



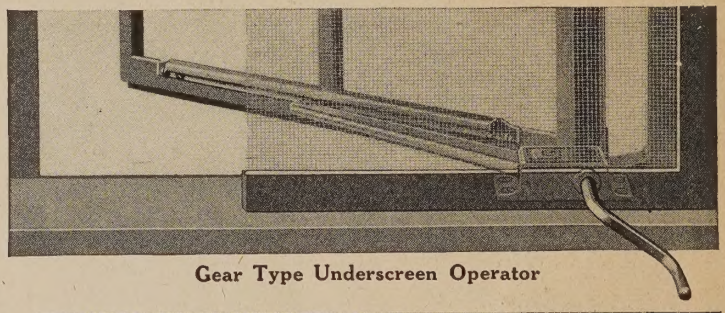
Extension (Cleaning) Hinge



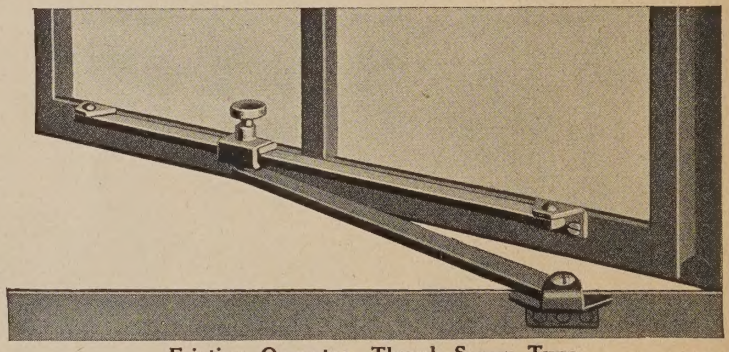
Sliding Stay Operator



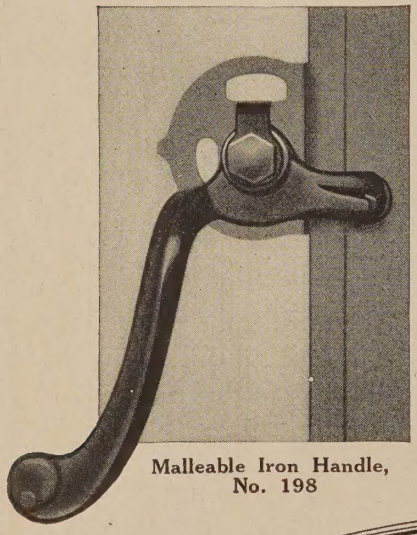
Bronze Handle, No. 699



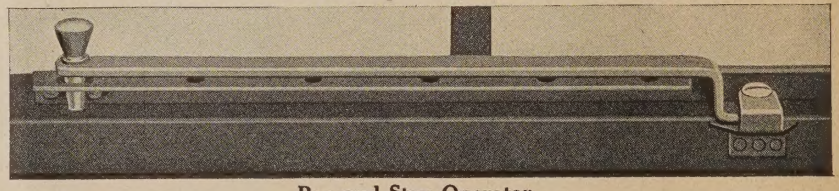
Gear Type Underscreen Operator



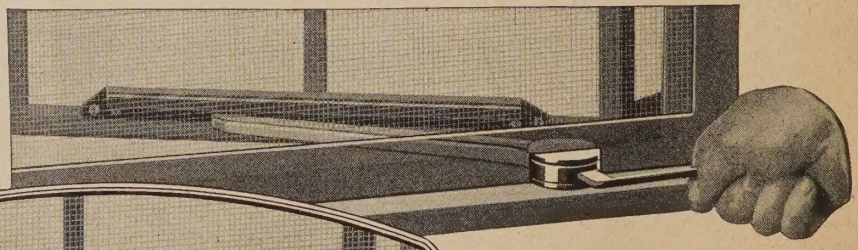
Friction Operator, Thumb Screw Type



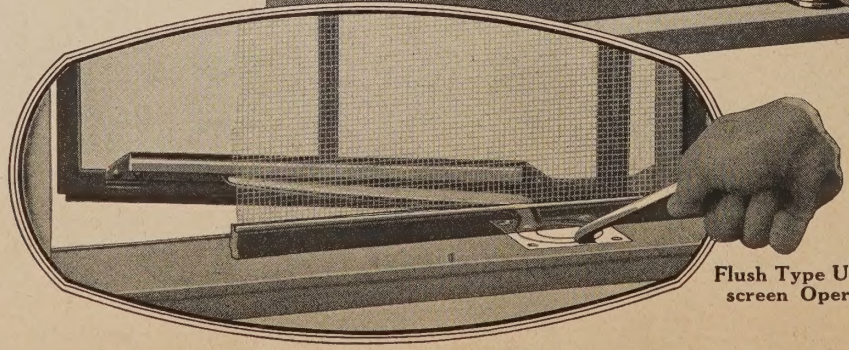
Malleable Iron Handle, No. 198



Peg and Stay Operator

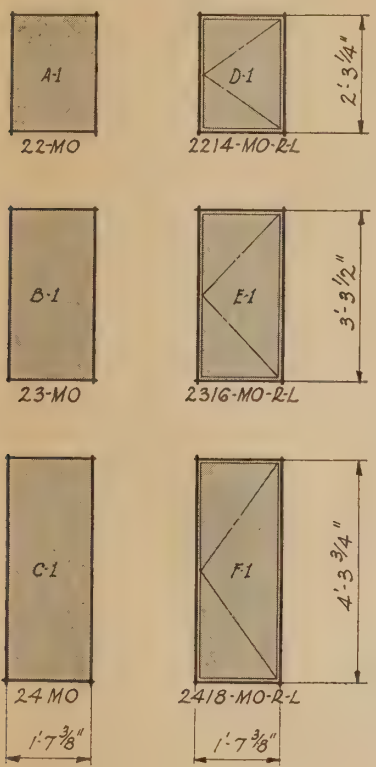


Surface Type Underscreen Operator



Flush Type Underscreen Operator

·SINGLE·LIGHT·UNITS·
·STOCK·TYPES·



Single Light Units— Stock Types

To accommodate large lights of plate glass or panels of leaded glass, the six Single Light Units shown at the left on this page have been placed in stock and are now ready for immediate delivery, as are the other stock types shown on Plate A-102.

These casements correspond in every respect to the same sized units (fixed and ventilated) on Plate A-102 except that no provision is made for interior muntin bars. The units shown on this page have, therefore, a clean perimeter free from the punching necessary when muntin bars are optional.

Glass sizes are shown opposite the letters in the table below.

When ordering any stock, easement units designed for single lights of plate glass or leaded glass panels, specify "M.O." (Muntins Omitted.) Ventilated units are Right or Left handed as desired.

Built-In Transoms— Stock Types

In addition to other stock types of Fenestra Casements (shown with shaded backgrounds) on Plate A-102 and on this page, the four types shown at the right are now stocked for immediate delivery.

These casements include built-in transoms, one-light-high, top hung, to open out.

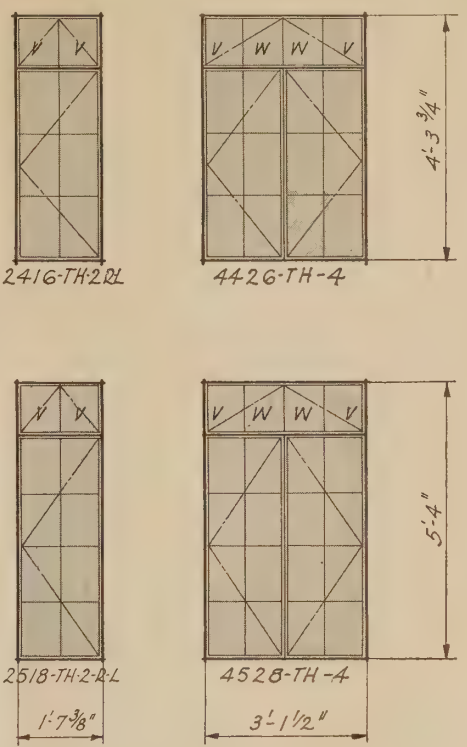
Glass dimensions are shown by the letters in the table below. These units are supplied in ventilated types only, 2-light-wide units being Right or Left handed as desired.

One-light-high transoms are always "built in" and cannot be furnished separately.

·GLASS·SIZES·

V	8" × 10"	C-1	17⅜" × 49⅞"
W	8 11/16" × 10"	D-1	16¼" × 24¼"
A-1	17⅜" × 25⅜"	E-1	16¼" × 36½"
B-1	17⅜" × 37⅜"	F-1	16¼" × 48¾"

·BUILT-IN·TRANSOMS·
·TOP-HUNG·OPEN-OUT·
·STOCK·TYPES·



SUGGESTIONS FOR LEADED GLASS PANELS

The following page (Plate A-111) shows suggested designs and dimensions for standard Leaded Glass Panels of a size and character to fit stock types of Fenestra Casements including the Single Light Units and Built-In Transom Units shown above. (No panels are shown suitable for semi-circular heads.)

We do not make leaded glass. The accompanying suggestions are offered for the benefit of architects and builders, so that leaded panels may be purchased locally with assurance of correct dimensions and with a minimum of detail labor and expense.

In designing both the Rectangular Leaded and the Diamond Leaded panels, we have kept constantly in mind the proportions used in the fine examples of Tudor architecture. The glass dimensions, 5½" by 8", which were so frequently utilized by the masters of that period, have been retained as nearly as possible and standardized as far as compatible with stock types and sizes.

Eighteen different panels are shown in Rectangular leaded and in Diamond Leaded types. Six of these panels are dimensioned to fit ventilated units or the ventilated portion of combination units and are so indicated by the prefixed letter "V". Six panels are dimensioned to fit fixed units or the fixed portions of combination units and are so indicated by the prefixed letter "F". Six panels are dimensioned to fit fixed transoms in single or combined units and are so indicated by the letter "T". The numbers "22", "24", "62" and so on DO NOT REFER to the number of panes in the width and height of the Leaded Glass panels, but DO REFER to the number of standard panes in the width and height of the stock casements into which the panels are designed to fit. The letters "RL" and "DL" indicate "Rectangular Leaded" and "Diamond Leaded" panels respectively.

Thus the stock casement Type 22 (Plate A-102) with muntins omitted, can be fitted with either RL-22-F or DL-22-F. The dimensions of the casement will be 1' 7⅜" by 2' 3¼" while the dimensions of either leaded panel will be 17⅜" x 25⅜".

A table of our stock types of casements and the leaded glass panels required for each is given at the right.

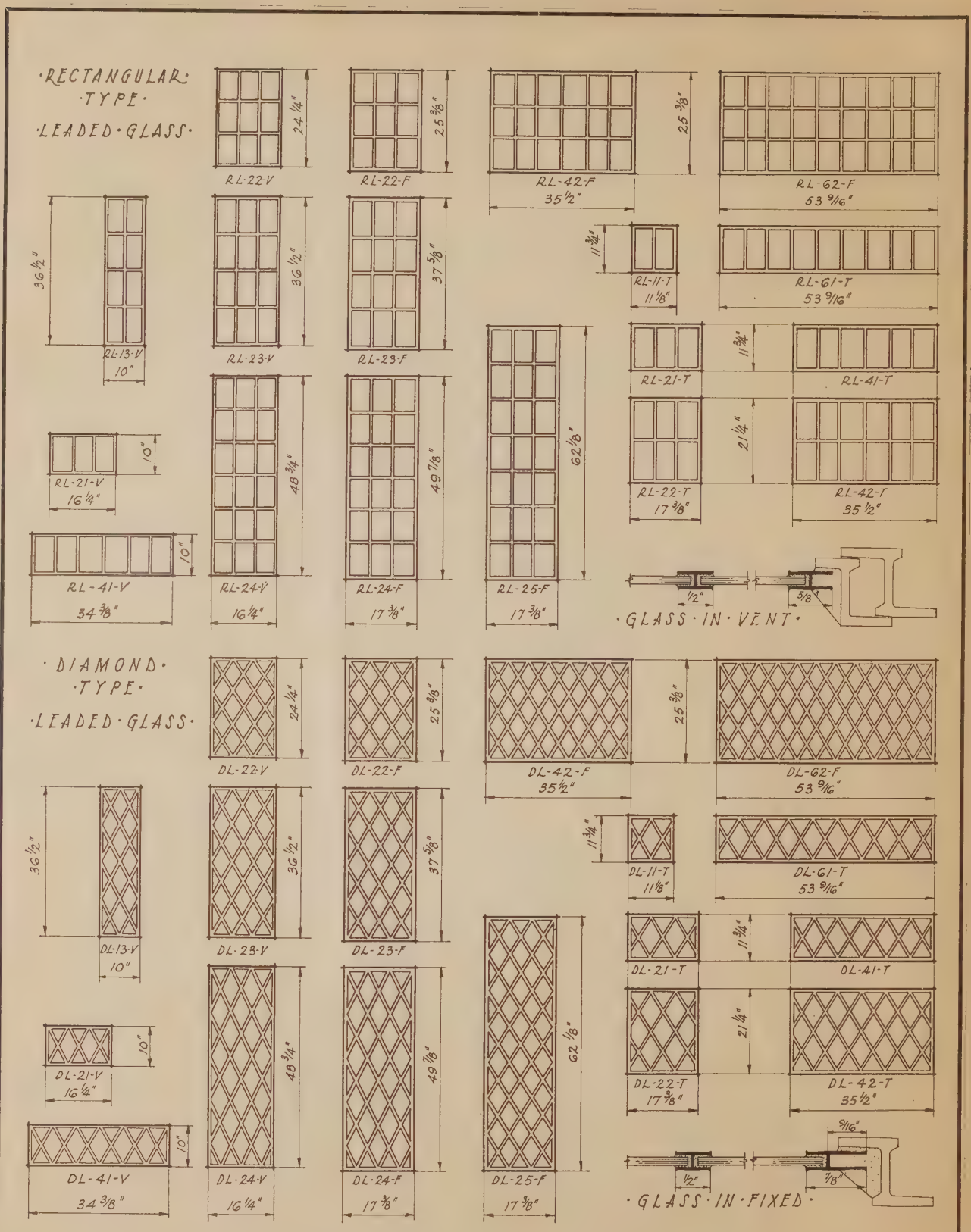
All leaded glass designs have been carefully arranged so that when several panels are used in combination units, the various panels form a harmonious whole with cames in proper relation to one another.

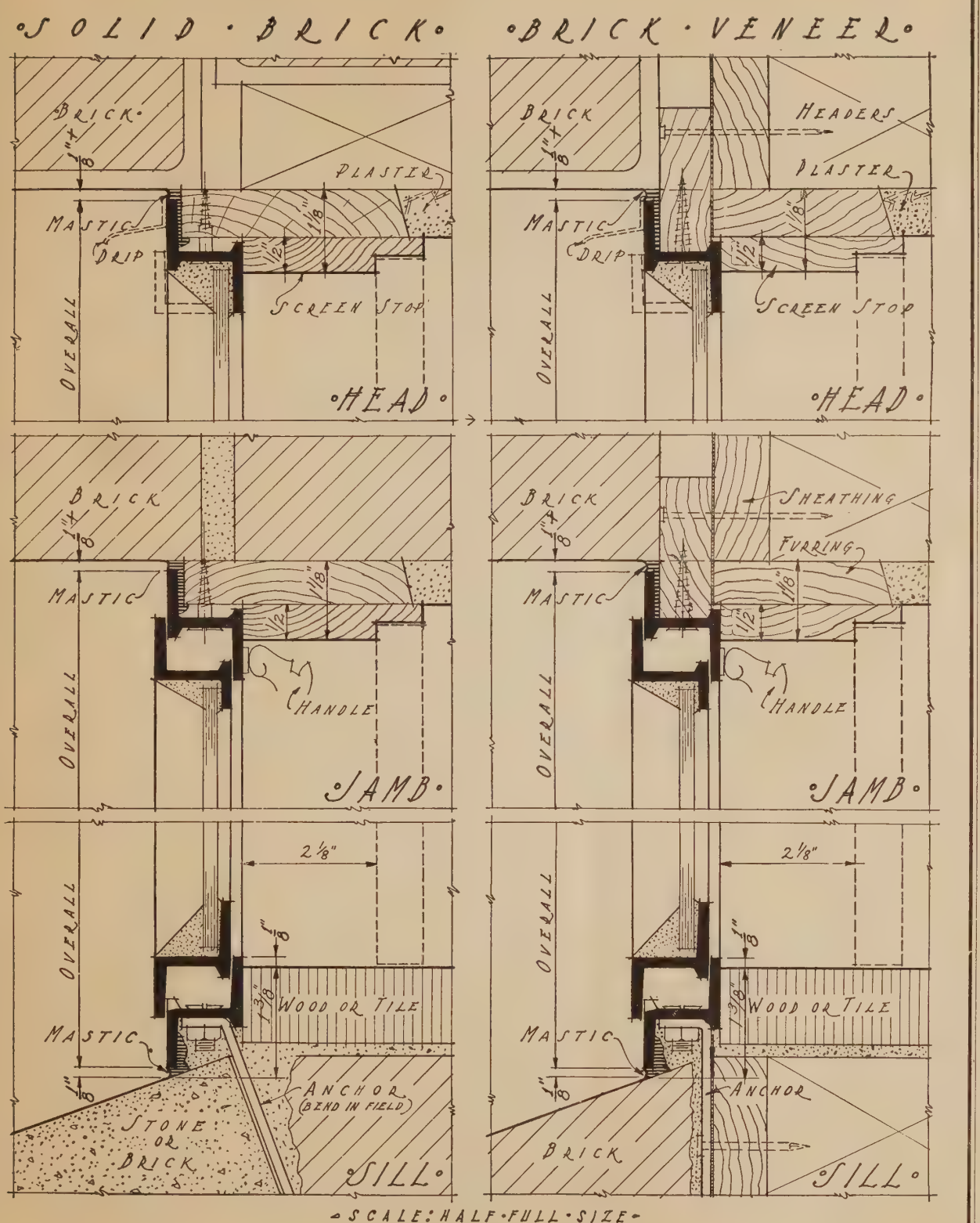
All lights should be double strength clear glass. Framing cames should be ⅞" offset flat lead on Fixed and Transom Panels and ⅝" flat lead on Ventilating Panels. All interior cames should be ½" flat lead.

Stock Types of Casements and Leaded Glass Panels required for each

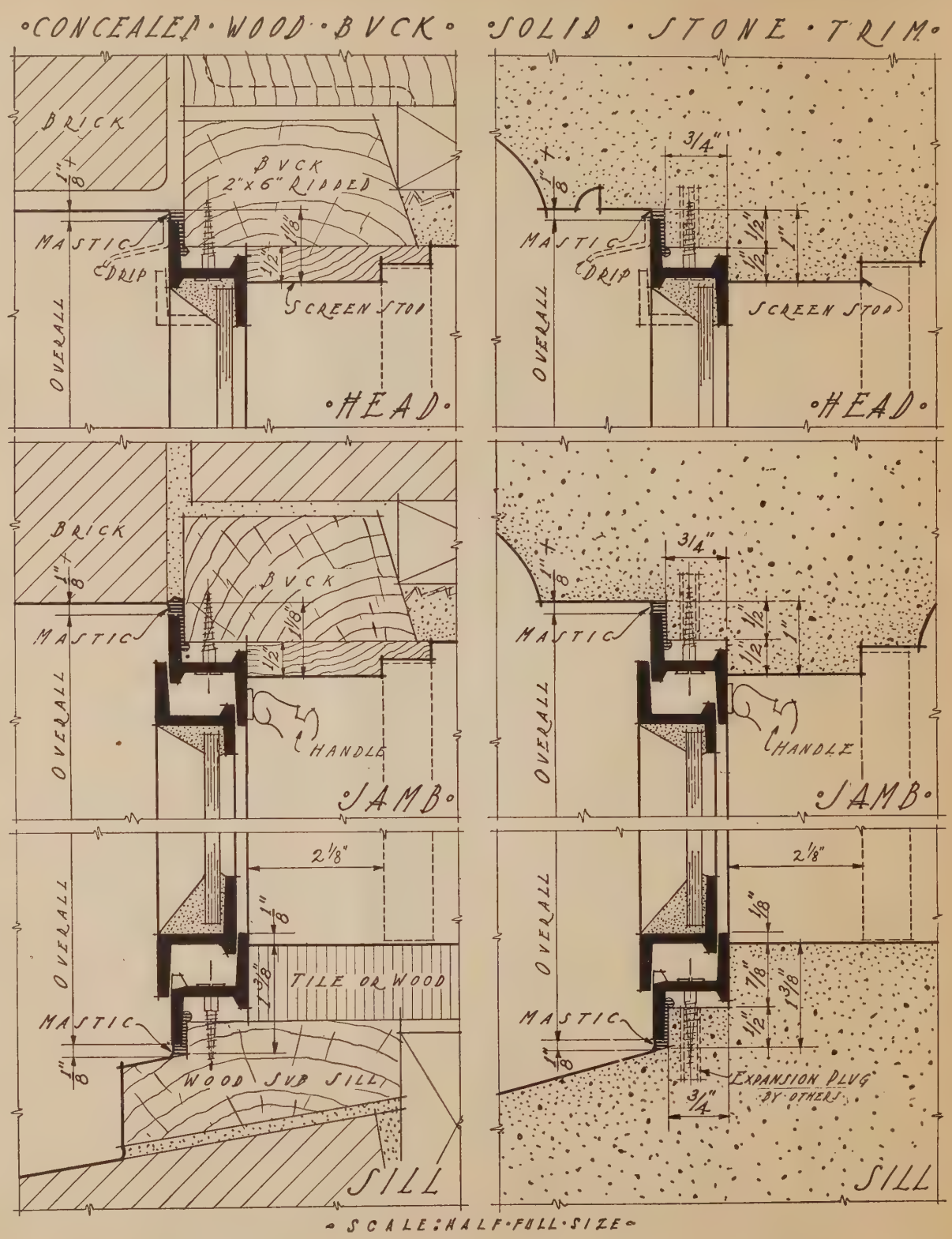
Insert the letters MO (Muntins Omitted) after each casement type specified for leaded glass

Casement Type	No. Panels	Type of Panels			
1313 R/L	1	13 V			
1413 R/L	2	13 V	11 T		
22	1	22 F			
2214 R/L	1	22 V			
2214 TH	1	22 V			
23	1	23 F			
2316 R/L	1	23 V			
24	1	24 F			
2416 R/L	2	23 V	21 T		
2416 TH-2-R/L	2	23 V	21 V		
2418 R/L	1	24 V			
25	1	25 F			
2518 R/L	2	24 V	21 T		
2518 TH-2-R/L	2	24 V	21 V		
2618 R/L	2	24 V	22 T		
42	1	42 F			
4214 R/L	2	22 V	22 F		
4214 TH R/L	2	22 F	22 V		
4224	2	22 V	22 V		
4224 TH	2	22 V	22 V		
4316 R/L	2	23 F	23 V		
4326	2	23 V	23 V		
4416 R/L	3	23 F	23 V	41 T	
4418 R/L	2	24 F	24 V		
4426	3	23 V	23 V	41 T	
4426 TH-4	3	23 V	23 V	41 V	
4428	2	24 V	24 V		
4518 R/L	3	24 F	24 V	41 T	
4528	3	24 V	24 V	41 T	
4528 TH-4	3	24 V	24 V	41 V	
4628	3	24 V	24 V	42 T	
62	1	62 F			
6214 TH	3	22 F	22 V	22 F	
6224	3	22 V	22 F	22 V	
6224 TH	3	22 V	22 F	22 V	
6326	3	23 V	23 F	23 V	
6426	4	23 V	23 F	23 V	61 T
6428	3	24 V	24 F	24 V	
6528	4	24 V	24 F	24 V	61 T

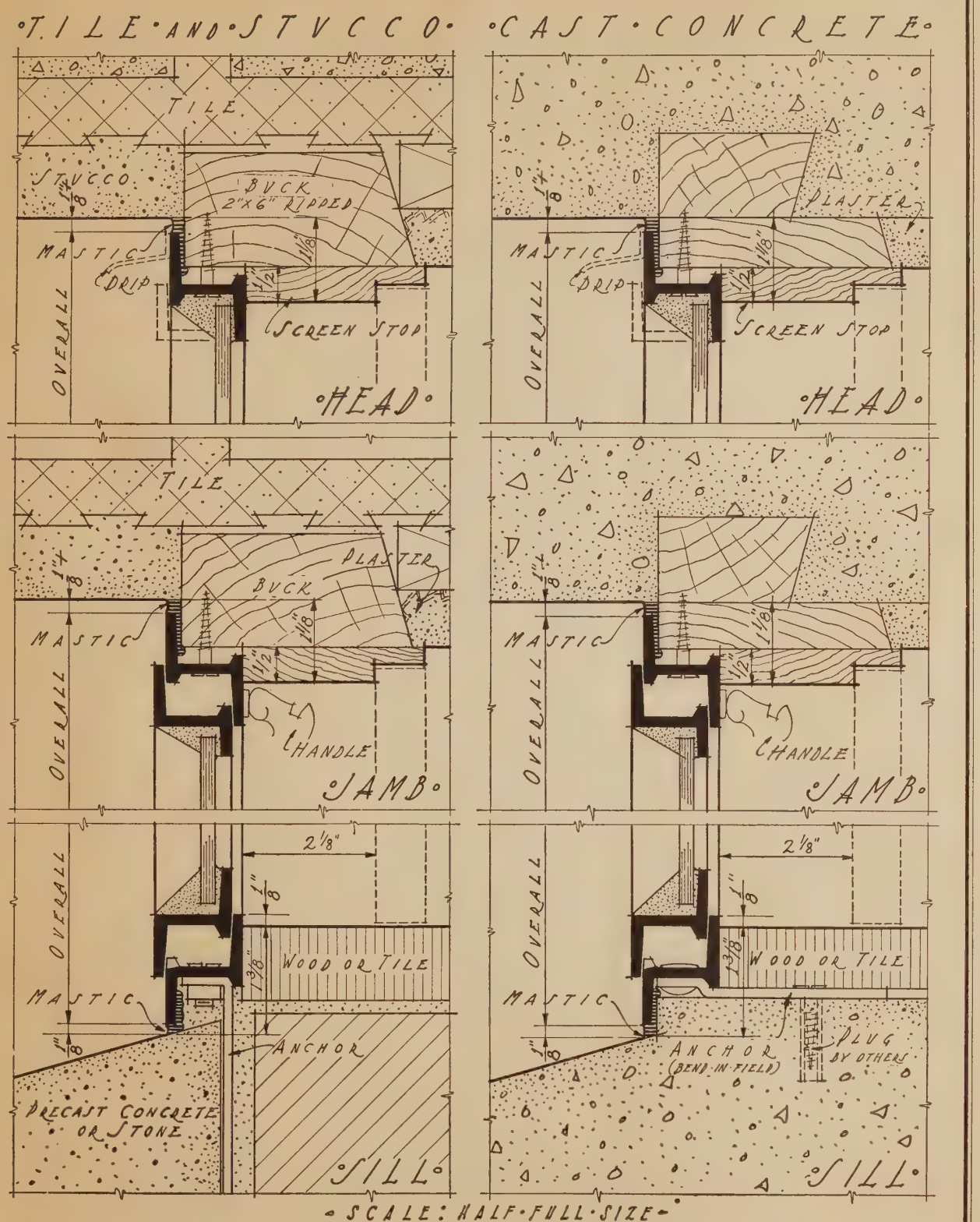

·RECTANGULAR·
·TYPE·
·LEADED·GLASS·
RL-22-V
24 1/4"
RL-22-F
25 3/8"
RL-42-F
35 1/2"
25 3/8"
RL-62-F
53 9/16"
36 1/2"
RL-13-V
10"
RL-23-V
36 1/2"
RL-23-F
37 5/8"
11 3/4"
RL-11-T
11 1/8"
RL-61-T
53 9/16"
RL-21-V
16 1/4"
10"
RL-21-T
11 3/4"
RL-41-T
RL-41-V
34 3/8"
10"
RL-24-V
48 3/4"
16 1/4"
RL-24-F
49 7/8"
17 3/8"
RL-25-F
62 1/8"
17 3/8"
21 1/4"
RL-22-T
17 3/8"
RL-42-T
35 1/2"
1/2"
5/8"
·GLASS·IN·VENT·
·DIAMOND·
·TYPE·
·LEADED·GLASS·
DL-22-V
24 1/4"
DL-22-F
25 3/8"
DL-42-F
35 1/2"
25 3/8"
DL-62-F
53 9/16"
36 1/2"
DL-13-V
10"
DL-23-V
36 1/2"
DL-23-F
37 5/8"
11 3/4"
DL-11-T
11 1/8"
DL-61-T
53 9/16"
DL-21-V
16 1/4"
10"
DL-21-T
11 3/4"
DL-41-T
DL-41-V
34 3/8"
10"
DL-24-V
48 3/4"
16 1/4"
DL-24-F
49 7/8"
17 3/8"
DL-25-F
62 1/8"
17 3/8"
21 1/4"
DL-22-T
17 3/8"
DL-42-T
35 1/2"
9/16"
1/2"
7/8"
·GLASS·IN·FIXED·



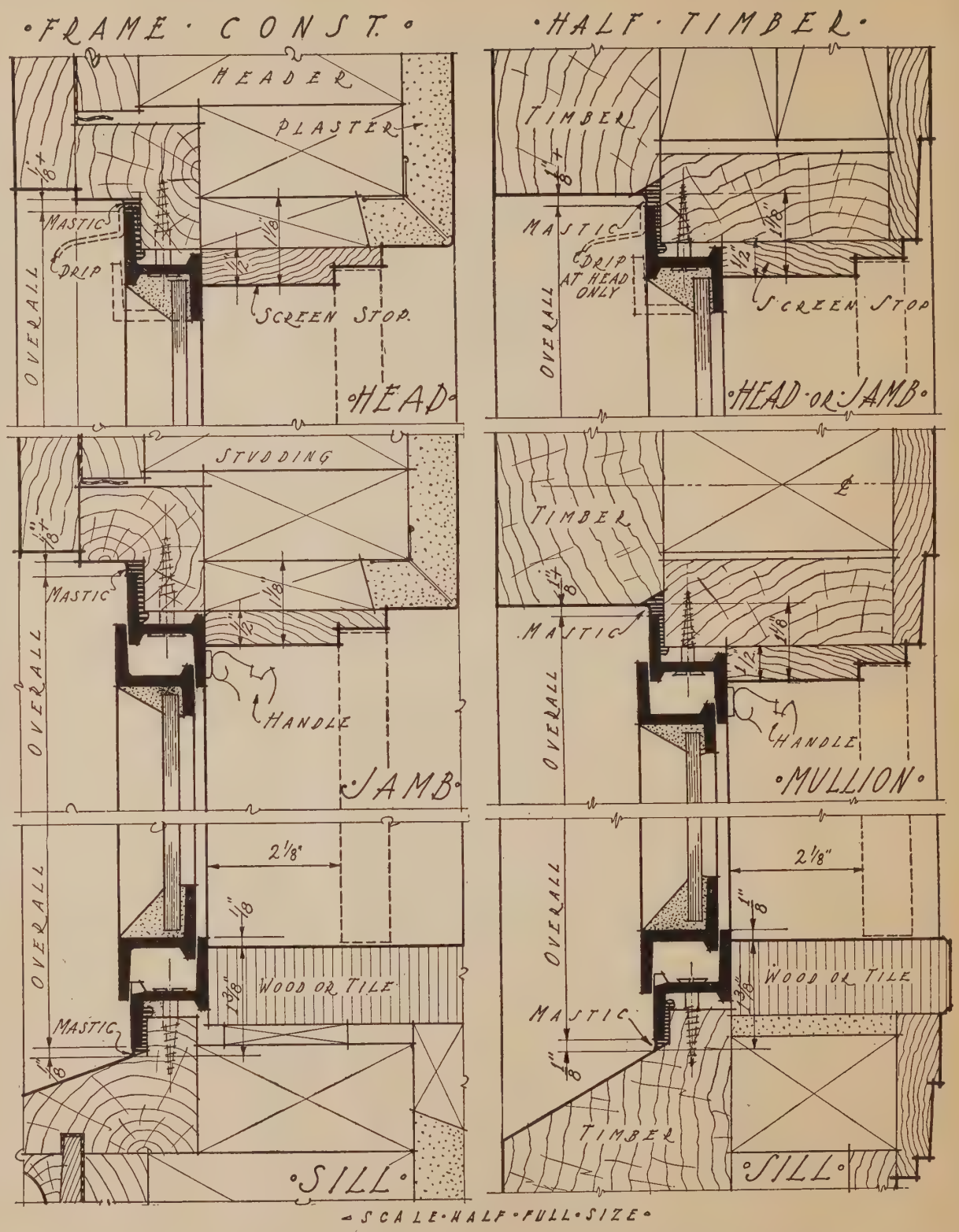
Fenestra, August 1927	Steel Casement Windows Installation Details	Plate No. A-103



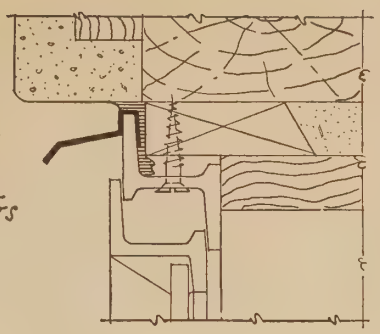
Fenestra August 1927	Steel Casement Windows Installation Details	Plate No A-104



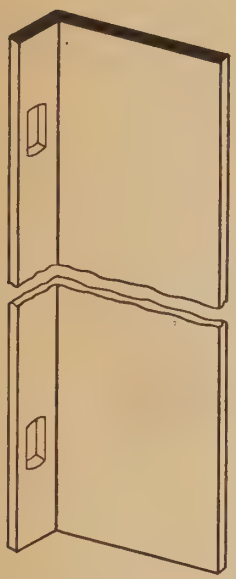
Fenestra, August 1927	Steel Casement Windows Installation Details	Plate No. A-105

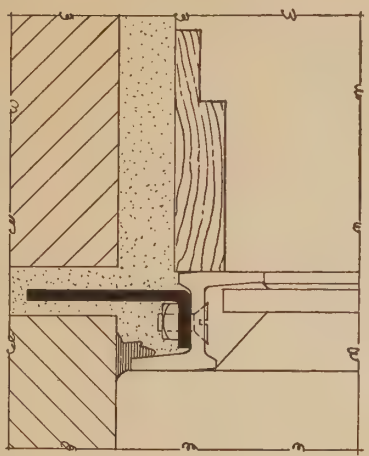


Fenestra, August 1927	Steel Casement Windows Installation Details	Plate No A-106

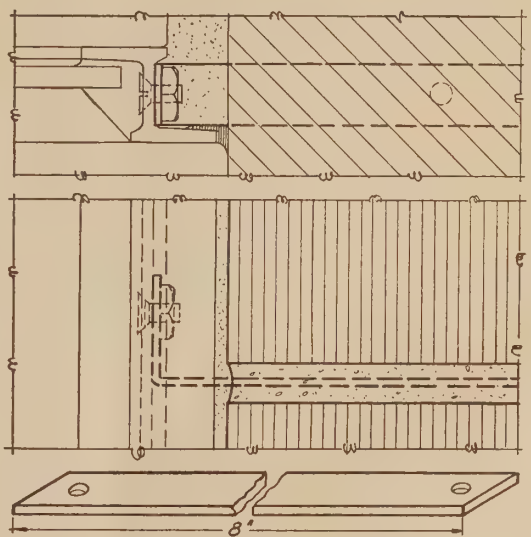


NO. 20 GUAGE COLD ROLLED COPPER DRIP TO BE USED WHERE VENT LEAVES EXTEND TO HEAD OF FRAME. SNAPS OVER FRAME SECTION WITHOUT BOLTS OR RIVETS



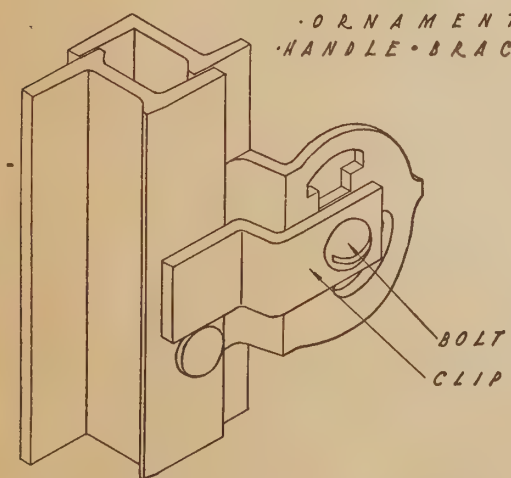


CONTINUOUS, SOLID ROLLED STEEL FIN TO BE BOLTED TO JAMBS AND HEAD WHERE FRAMES ARE BUILT INTO MASONRY. SUPPLIED AT A SLIGHT ADDED COST TO PROVIDE GREATER ANCHORAGE AND FORM A WIND STOP.

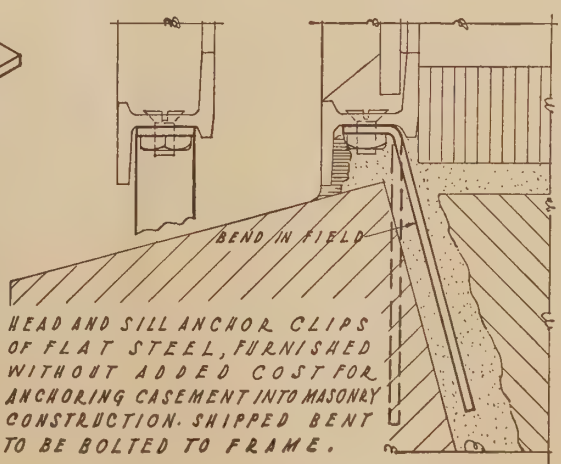


JAMB ANCHOR CLIPS OF FLAT STEEL FURNISHED WITHOUT ADDED COST WHERE CONTINUOUS STEEL FIN IS NOT SPECIFIED. SHIPPED FLAT. TO BE BOLTED TO FRAME AND BENT TO FIT NEAREST BRICK, TILE OR STONE JOINT.

·ORNAMENTAL· ·HANDLE·BRACKET·

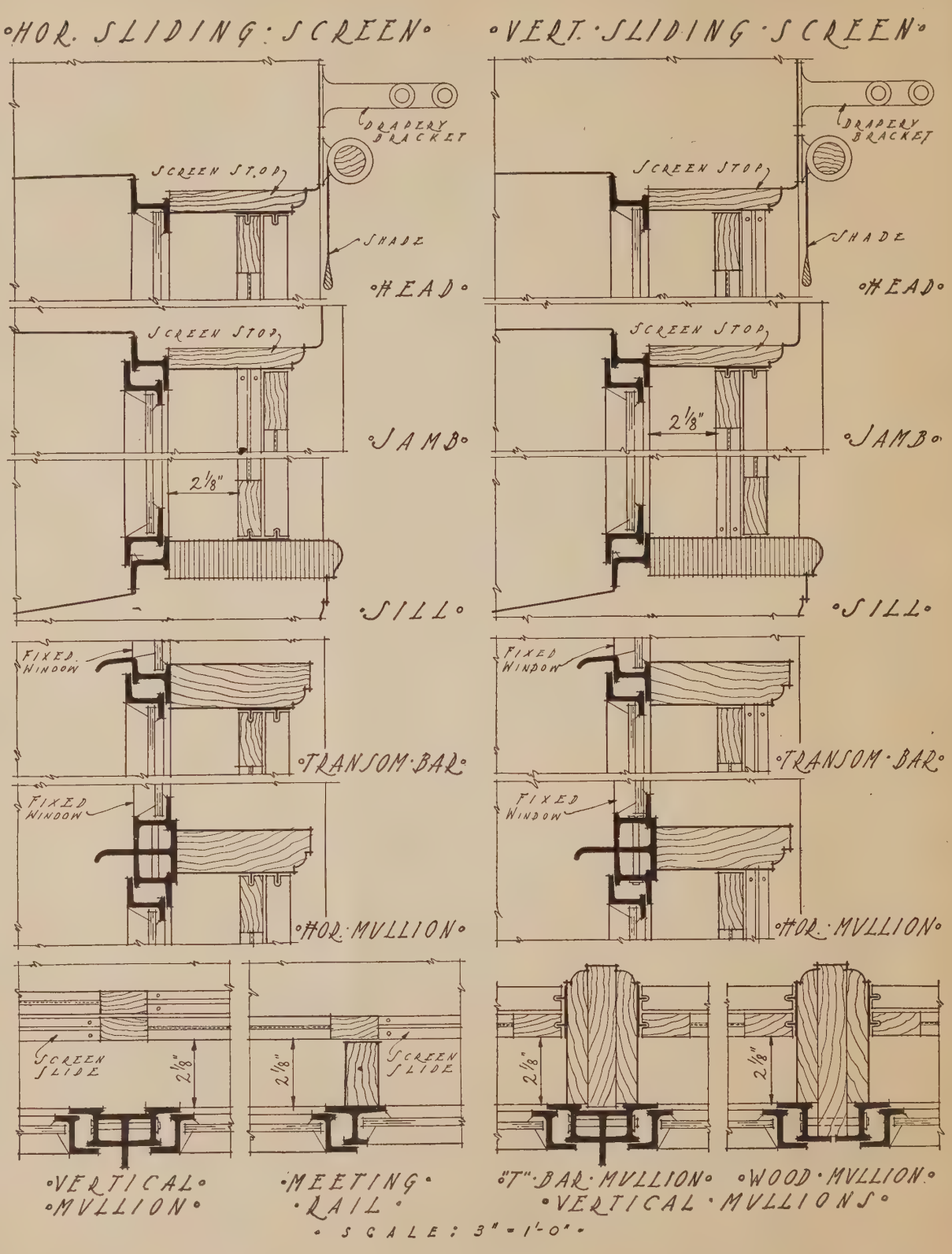


STEEL LOCKING CLIP BOLTED TO ORNAMENTAL HANDLE BRACKET BEFORE CASEMENTS ARE SHIPPED TO KEEP SWING LEAVES TIGHT SHUT UNTIL HARDWARE IS ATTACHED. IF LOOSENED FOR PAINTING OR ATTACHMENT OF ANCHORS, CLIP SHOULD BE RETIGHTENED AT ONCE TO PREVENT ENTRANCE OR DAMAGE.



HEAD AND SILL ANCHOR CLIPS OF FLAT STEEL, FURNISHED WITHOUT ADDED COST FOR ANCHORING CASEMENT INTO MASONRY CONSTRUCTION. SHIPPED BENT TO BE BOLTED TO FRAME.

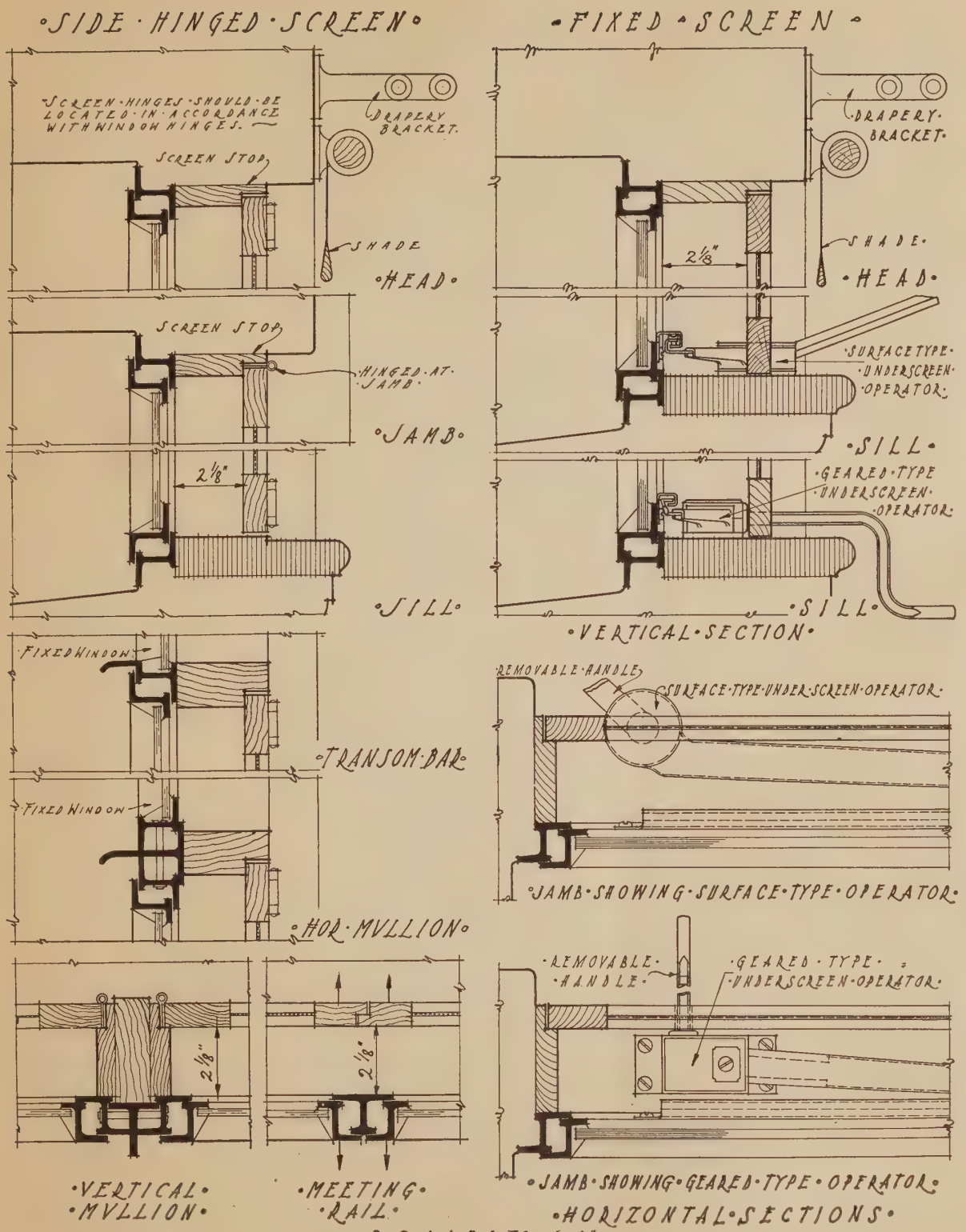
Fenestra, August 1927	Steel Casement Windows Drip, Fins and Anchors	Plate No A-107



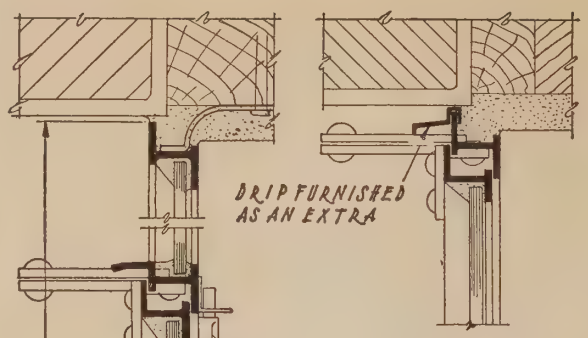
Fenestra August 1927

Steel Casement Windows
Screening and Shading Details

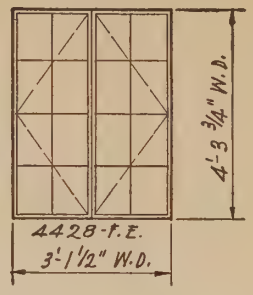
Plate No A-108

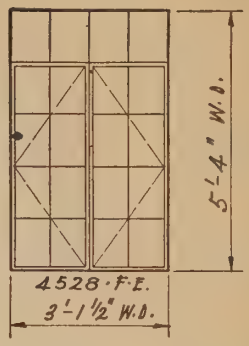


Fenestra August 1927	Steel Casement Windows Screening and Shading Details	Plate No A-109

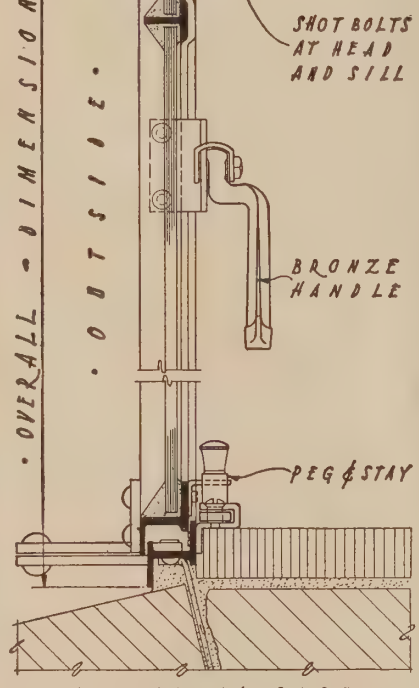


·SECTION·SHOWING·
·VENTILATOR·AT·HEAD·

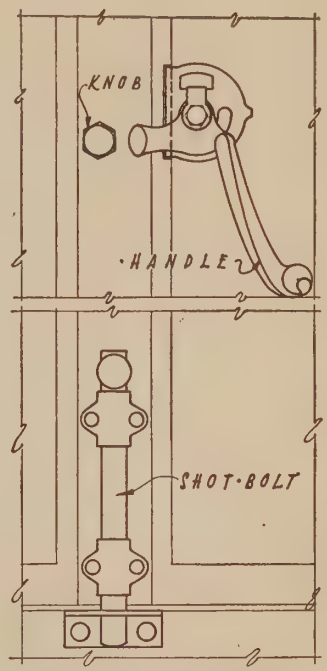




·STANDARD·TYPES·



·VERTICAL·SECTION·
·SHOWING·TRANSOM·ABOVE·VENT·



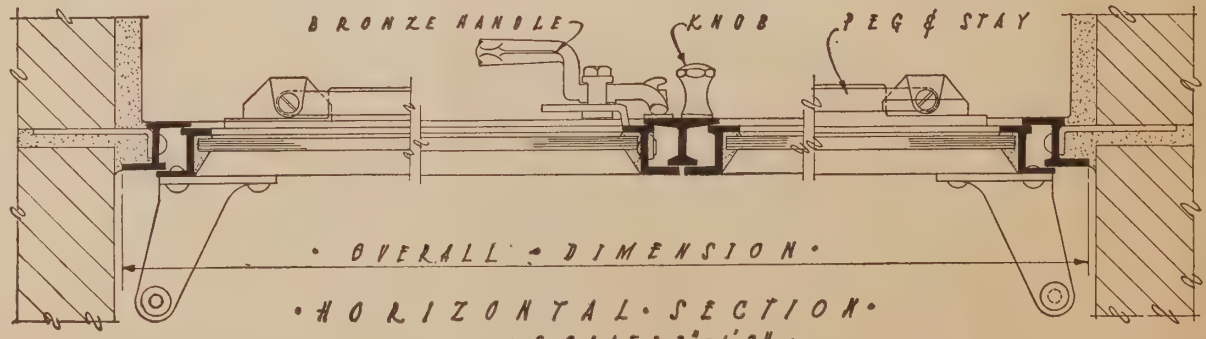
·ELEVATION·OF·HANDLE·
·KNOB·&·SHOT·BOLT·

·NOTE·

FENESTRA FIRE-ESCAPE WINDOWS ARE MADE ONLY IN THE TYPES SHOWN. THE MEETING RAIL BAR IS FASTENED TO THE RIGHT HAND VENTILATOR (VIEWED FROM OUTSIDE) AND SWINGS WITH IT, THUS GIVING A CLEAR OPENING OF ABOUT 9 FEET WHEN WINDOWS ARE OPEN.

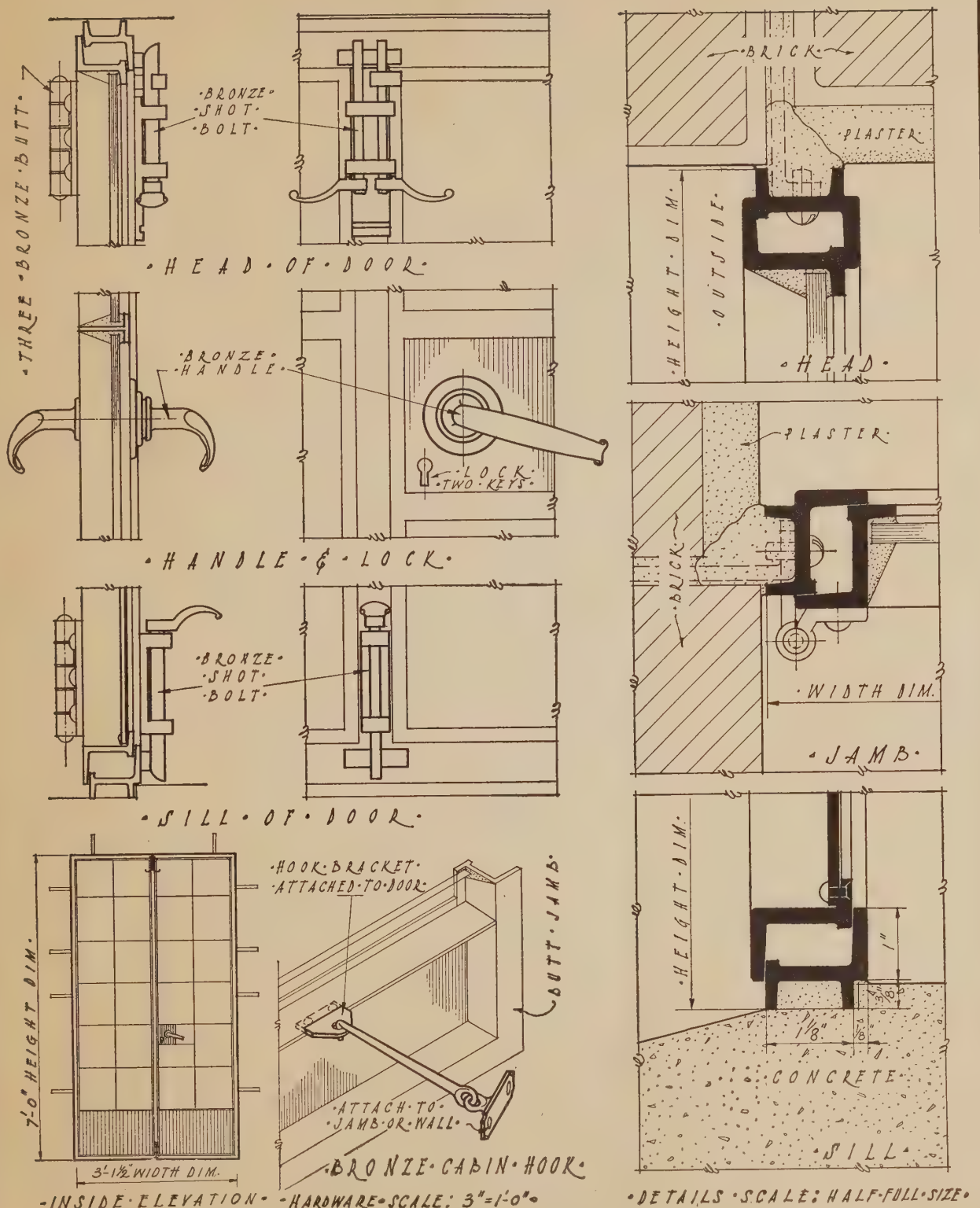
PEG AND STAY HARDWARE WITH RELEASING SLOT IS ALL THAT CAN BE FURNISHED WITH THIS TYPE OF WINDOW. THIS ALLOWS THE VENTILATOR TO OPEN WHEN HANDLE OR SHOT BOLTS ARE RELEASED WITHOUT HAVING TO LIFT PEG OUT OF END SLOT.

·END·OF·STAY·PLATE·SHOWING·
·ARRANGEMENT·OF·RELEASING·SLOT·
·PEG·DISENGAGES·AUTOMATICALLY·
·WHEN·WINDOW·IS·PUSHED·OPEN·



·HORIZONTAL·SECTION·
-SCALE: 3"-1'-0"-

Fenestra *August 1927*	*Steel Casement Windows* *Fire Escape Details*	**Plate No** *A-110*



Fenestra
August 1927

Steel Casement Doors
Elevations and Details

Plate No
B-101

(D) STEEL BASEMENT WINDOWS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications

Note: These windows are sold exclusively through dealers. See Paragraph 12 Fenestra Page 2.

(D-1) Work Included

Note: List and locate. (See Paragraph 13 Fenestra Page 2.)

(D-2) General

Basement Windows shall be *Fenestra* as manufactured by DETROIT STEEL PRODUCTS COMPANY.

(D-3) Materials

All sections shall be specially designed, hot rolled, solid steel bars with heavy fillets in all re-entrant angles. All frame and sash members shall be rolled with ⅛" baffles. Sash bottom rails shall be rolled with special projecting drip. Provide steel fins for jamb anchorage and weathering. Muntins shall be T bars. Provide two holes in each frame jamb for screen attachment.

Note: Sections (except sash bottom rails) are similar to Casement Window Sections (see Fenestra Page 4) arranged for inside glazing.

(D-4) Construction

Sills and jambs of frame shall be continuous of one piece mitered and turned at corners. Joints at head of frame and all joints of sash shall be mortise and tenon, air hammer riveted. Fins shall be spot welded to frame jambs. Provide continuous, two-point, flat contact weathering between sash and frame.

(D-5) Hardware

All hardware shall be of steel and shall be attached at the factory. Hinges shall be of "pinless" hook design riveted to the frame, so constructed, in conjunction with formed slots in the sash top rail, that the sash may be removed for glazing. Locks shall be self-centering and shall consist of a bevel lipped, slotted angle, riveted to sill and a wedge pin attached by ring and heavy chain to the bottom rail of sash to act as the support for the sash when open.

(D-6) Erection

Basement windows shall be set plumb and true securely anchored to the building construction. Adjust all sash to properly operate.

(D-7) Painting

All Basement Windows shall be given one dip-coat of grey, lead and oil paint by the Manufacturer before shipment.

Note: The following should be provided for in the painting specifications:

One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.

(D-8) Glass and Glazing

Note: The following should be included in the Glazing Specifications:

Note: See Paragraph 10 Fenestra Page 2.

(D-8a) **Glass**—Glass shall be double strength.

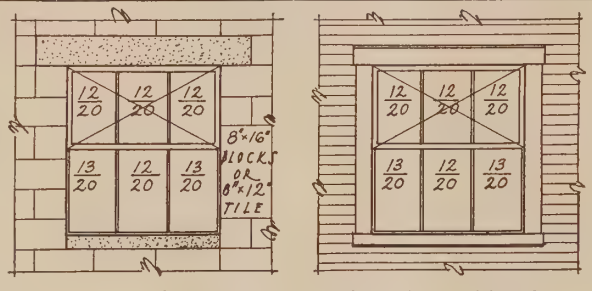
Note: Single strength glass is not recommended.

(D-8b) **Putty**—Putty shall be a high grade Steel Window Putty.

Note: Ordinary wood sash putty must not be used. See Paragraph 11 Fenestra Page 2.

(D-8c) **Glazing**—All windows shall be glazed from the inside. All glass shall be set in a bed of putty and secured by copper plated, steel, spring glazing clips furnished by the Window Manufacturer. Face putty shall be applied in a neat, clean-cut, smooth manner.

Note: Do not paint until putty has thoroughly hardened. See Paragraph (D-7).



ELEVATION OF WINDOWS INSTALLED IN CONCRETE BLOCK AND FRAME CONSTRUCTION

NOTE

THE FENESTRA UTILITY WINDOW IS DESIGNED FOR SMALL BUILDINGS SUCH AS GARAGES FILLING-STATIONS, SHOPS, STORES AND BASEMENTS HIGH ABOVE THE GRADE LINE.

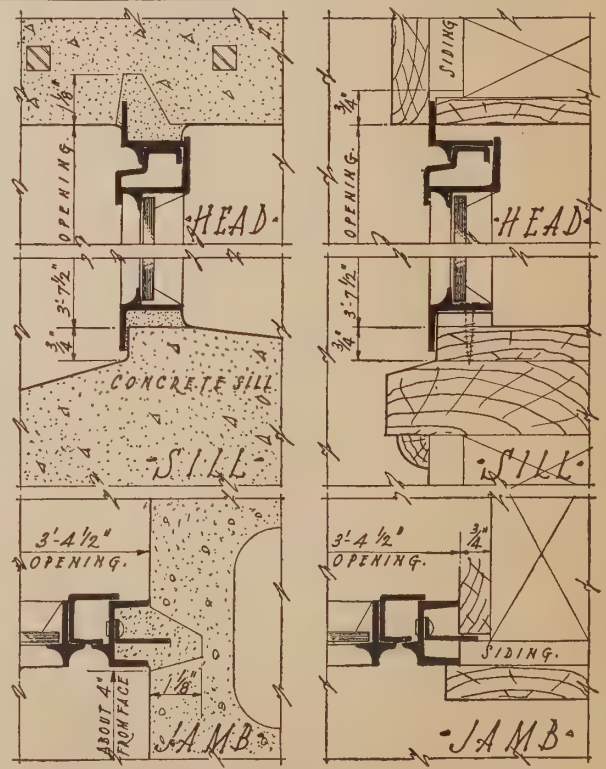
IT IS ALSO DESIRABLE IN AREA-WAYS WHERE MORE LIGHT IS NEEDED THAN IS SUPPLIED THRU FENESTRA BASEMENT WINDOWS, AS IN LAUNDRY ROOMS.

IT IS MADE IN ONE SIZE, ONLY, 3'-4½" × 3'-7½".

VENTILATOR IS ONE LIGHT HIGH, PIVOTED 2" ABOVE CENTER TO PREVENT UNDUE PROJECTION EITHER INSIDE OR OUTSIDE.

SECTIONS AND FITTINGS ARE THE SAME AS FOR HORIZONTALLY PIVOTED WINDOWS.

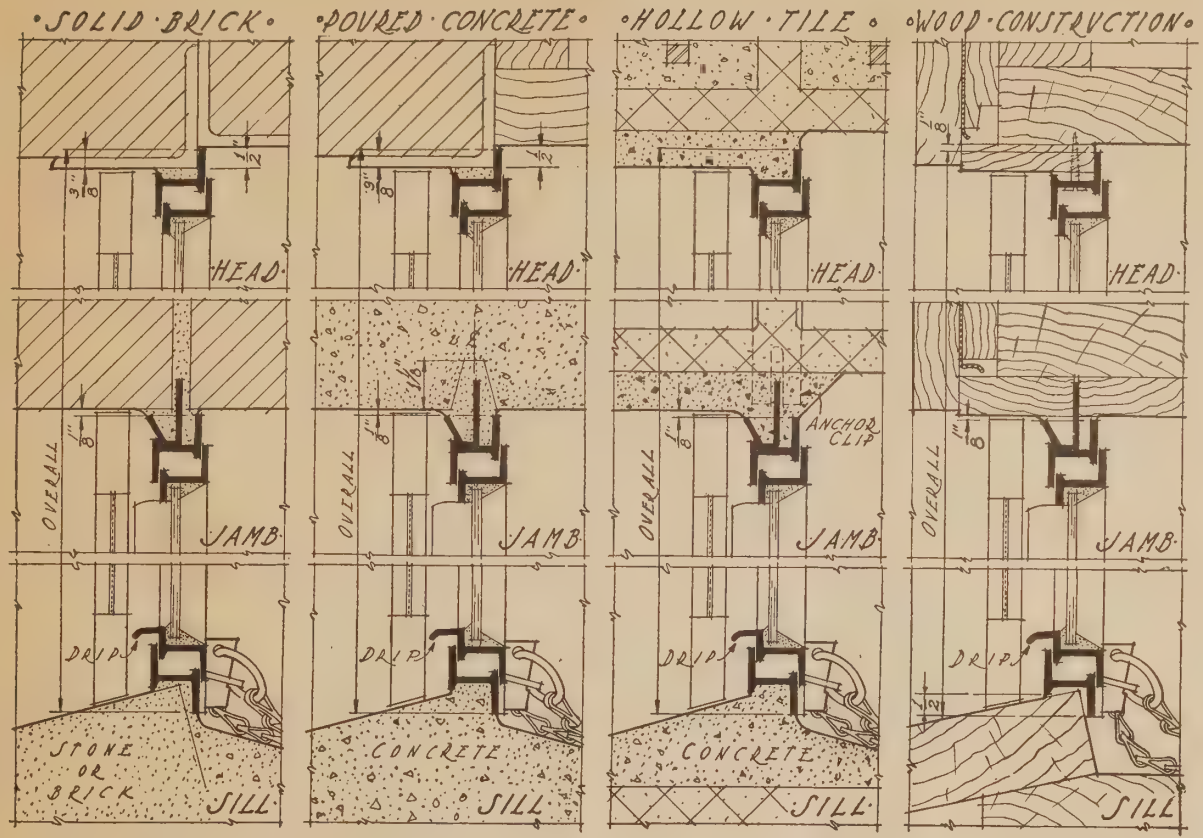
OPERATING HARDWARE CONSISTS OF IRON CAM HANDLE AND NOTCHED STAY-BAR AS IN HORIZONTALLY PIVOTED WINDOWS.



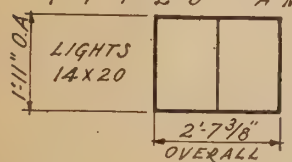
INSTALLATION DETAILS

SCALE: 3" = 1'-0"

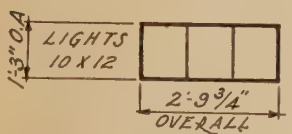
Fenestra August 1927	Steel Utility Windows Types, Sizes and Details	Plate No C-101



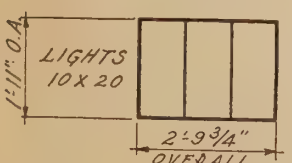
TYPES AND SIZES



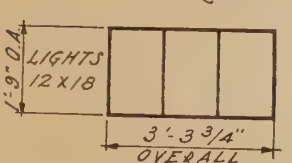
IN CONCRETE BLOCK CONSTRUCTION, FITS OPENING TWO BLOCKS WIDE BY THREE BLOCKS HIGH WITH A TROWELED SILL.



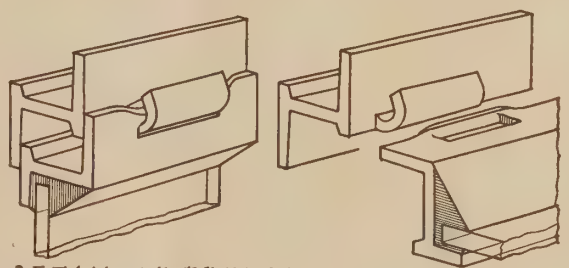
FOR HOUSES WITH LOW GRADE LINES — WORKS OUT EXCEPTIONALLY WELL IN BRICK CONSTRUCTION.



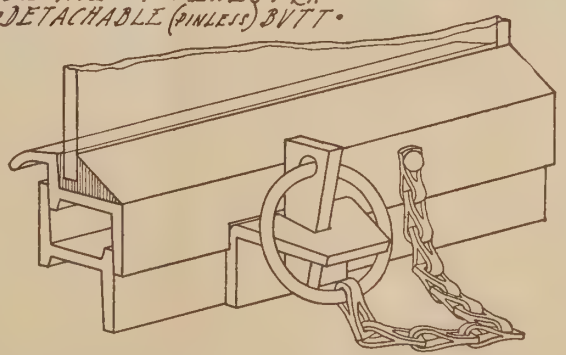
FOR HOUSES WITH A HIGHER GRADE LINE. WORKS OUT WELL IN BRICK OR CONCRETE BLOCKS



WORKS OUT WELL WITH EITHER BRICK OR CONCRETE BLOCK; AND IS THE WINDOW MOST USED IN THE AVERAGE TYPE OF CONSTRUCTION.



DETAIL OF FENESTRA DETACHABLE (PINLESS) BUTT



DETAIL OF SELF-CENTERING KEEPER

SCALE: 3" = 1'-0"

Fenestra August 1927	Steel Basement Windows Types, Sizes and Details	Plate No D-101

(G) ARCHITECTURAL PROJECTED WINDOWS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications

(G-1) Work Included

Note: List and locate. (See Paragraph 13 Fenestra Page 2).

(G-2) General

Architectural Projected Windows shall be *Fenestra* as manufactured by DETROIT STEEL PRODUCTS COMPANY.

(G-3) Materials

(G-3a) Window Sections—All sections shall be specially designed, hot rolled, solid steel bars with heavy fillets in re-entrant angles.
(G-3b) Frame Members—All frame members shall be unequal leg channel sections, outside leg 1⅝", inside leg ⅞".
(G-3c) Muntins—Muntins shall be 1⅜" deep.
(G-3d) Vertical Mullions—Vertical Mullions shall be standard Fenestra, hot rolled, solid steel T bars.

Note: Use where two or more windows are placed side by side in the same opening.

(G-3e) Horizontal Mullions—Horizontal mullions shall be standard Fenestra (hot rolled, solid steel Z bars and angles) (structural angles and channels).

Note: Specify type. Use where two or more windows are placed one above another in the same opening.

(G-3f) Mullion Covers—(Vertical) (Horizontal) Mullion covers shall be of pressed steel designed to neatly cover mullion recesses.

(G-4) Construction

(G-4a) Frames and Ventilators—Frames and ventilators shall be mortise and tenon, air hammer riveted and electrically welded at all corners. All exposed faces at welds shall be ground to a smooth finish. Provide continuous two point, flat-contact weathering between ventilators and frames.
(G-4b) Muntins—Muntin bars shall be continuous from head to sill and from jamb to jamb, so interlocked as to increase the rigidity and strength at the intersections. Joints at frames shall be mortise and tenon, air hammer riveted.

Note: Intersections of muntins are made as illustrated on Fenestra Page 44. An exclusive Fenestra feature.

(G-4c) Glazing (Angles) (Beads)—All glass shall be secured with glazing (angles) (beads) neatly mitered at corners. (Angles) (Beads) shall be secured to head, jamb and sill frame and ventilator members with brass tap screws and to muntins with brass barrel screws.

Note: Specify choice of angles or beads. Glazing Beads as detailed on Fenestra Page 21 are furnished at slightly added cost over the cost of angles.

(G-4d) Vertical Mullions—Where two or more windows are placed side by side in the same opening, provide vertical mullions with bolts for frame attachment.
(G-4e) Horizontal Mullions—Where two or more windows are placed one above another in the same opening, provide horizontal mullions with bolts for frame attachment.
(G-4f) Mullion Covers—Provide (vertical) (horizontal) steel mullion covers with the necessary clips and bolts for attachment.
(G-4g) Sill and Jamb Anchor Clips—Furnish steel (sill) (jamb) anchor clips with bolts to attach to frame as required.

(G-5) Attached Hardware

Note: Attached at Factory.

(G-5a) Ventilator Operating Hardware—Ventilators shall (swing-out from the bottom while sliding down from the top) (or) (swing-in from the top while sliding up from the bottom) as indicated. The *open-out* ventilators shall be so constructed that by tilting them slightly beyond the horizontal they may be conveniently washed from inside the building. (The *open-in* ventilators shall tilt to 90°.)

Note: Specify swing-out, swing-in or both as required.

Each ventilator shall be accurately balanced on two supporting arms of solid spring steel attached to the ventilator with bronze shoulder pivots, equipped with bronze washers. Connections between supporting arms and window frame shall be made by malleable iron brackets rigidly supported on the horizontal frame members or muntins and double riveted to the vertical frame members or muntins with arms attached by bronze shoulder pivots.
Each ventilator shall be equipped with two bronze friction shoes sliding vertically in the ventilator jambs to guide the ventilator and prevent rattling. Friction shoes shall be channel shaped (to insure ease of operation) and mounted on bronze shouldered studs, so constructed that through galvanized compression springs (covered by weather protecting bronze tubes) uniform tension is secured. Shoes shall be accurately gauged and located and solidly riveted in place to assure proper, constant pressure at the jambs.
(G-5b) Alignment Springs—Each *open-out* ventilator shall be equipped with two shouldered, alignment-control bronze springs riveted to the channel jambs.

Note: The shoulders of these springs are so designed and located as to limit the downward travel of the friction shoes and stop all open ventilators in uniform alignment of approximately 60 degrees. When it is desired to open the ventilator at a greater angle or reverse for washing, light pressure on the springs depresses the shoulders and allows the friction shoes to slide past. As the ventilator is returned to a closed position, the action of the spring is automatic. See Fenestra Page 19.

Note: Include if open-out ventilators are used.

(G-5c) Alignment Stops—Each *open-in* ventilator shall be equipped with a solid steel stop which prevents its opening farther than 90°.

Note: Include if open-in ventilators are used.

(G-5d) Cam Handle Brackets—Where required, provide special design malleable iron brackets, triple riveted to ventilators, for attachment of cam handles.

(G-6) Detached Hardware

Note: See Fenestra Page 19.

(G-6a) All detached hardware shall be shipped carefully packed to prevent damage until applied for use.
(G-6b) All hardware for Architectural Projected Windows shall be of bronze, light coinage finish.
(G-6c) Locking and Operating Devices

Note: Select as required.

Note: Where ventilators are screened, special flat-type bronze handles may be secured which will permit the screen to be set 1" from the face of the window instead of 2" necessary with standard cam handles. Specify if desired.

(1) *For open-out ventilators within reach from floor*—Bronze cam handle, Part 114, attached to malleable iron bracket by bronze screw-head bolt through steel spring friction clevis. Bronze strike plate carrying a 6" bronze hook stay, Part 122, riveted to window at ventilator sill.
(2) *For open-out ventilators beyond reach from floor*—Riveted bronze pole ring, Part 151, at head of ventilator. Bronze cam handle, Part 150, with hole for pole hook, attached to malleable iron brackets by bronze, screw-head, steel, spring, friction clevis. Riveted bronze strike plate.
(3) *For open-in ventilators within reach from floor*—Riveted bronze spring latch with ornamental handle, Part 212, at head of ventilator. Riveted bronze lipped strike.
(4) *For open-in ventilators beyond reach from floor*—(Riveted bronze spring latch with pole hook ring handle, Part 147, at head of ventilator; riveted steel strike). (Riveted bronze spring latch with endless chain, Part 146, at head of ventilator. Riveted steel strike. Riveted bronze chain guide, Part 149, at sill).

Note: Select type desired.

(G-7) Erection

Note: Include in the Masonry Specifications that all masonry openings shall be accurately constructed in accordance with the standard Fenestra installation details so that windows may be erected after masonry is completed. (See Paragraph 9, Fenestra Page 1.)

Note: Include in the Masonry Specifications that all mortar grouting, pointing, etc., shall be done by the Mason Contractor after windows have been erected.

(G-7a) All Architectural Projected Windows shall be erected in prepared openings by the FENESTRA CONSTRUCTION COMPANY, under a separate contract.

Note: See paragraph 5 Fenestra Page 1.

(G-7b) All windows shall be set plumb and true, properly aligned and securely anchored before glazing.
Standard Fenestra sill anchors shall be used under the following conditions:
(1) In all cases where a ventilator comes at the sill of the window, regardless of the window width.
(2) In all cases where the window is over 5′ 0" wide, regardless of the location of the ventilators.
(3) In all multiple unit openings where mullions are not anchored into the sills.
All ventilators shall be properly adjusted before glazing.

(G-7c) Apply all hardware in accordance with the manufacturer's directions. Detached hardware shall not be installed until after glazing and painting has been completed.

(G-8) Painting

All Windows shall be given one dip-coat of red mineral paint by the Manufacturer before shipment.

Note: The following should be provided for in the Painting Specifications:
One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.
Note: Where desired, the Fenestra Construction Company *(see Paragraph 5, Fenestra Page 1) at reasonable added cost will do field painting after erection. If required so specify here, including specification for paint and its application.*

(G-9) Glass and Glazing

Note: The following should be included in the Glazing Specifications:
Note: See Paragraph 10 Fenestra Page 2.

(G-9a) Glass—Glass shall be (¼" thick plate) (¼" wire of type desired) (double strength).

Note: ¼" thick glass is recommended. Single strength glass is not recommended.

(G-9b) Putty—Putty shall be a high grade steel window putty.
Note: Ordinary wood sash putty must not be used. See paragraph 11, Fenestra Page 2.

(G-9c) Glazing—All Architectural Projected Windows shall be glazed from the inside. All glass shall be set in a bed of putty and secured with glazing (angles) (beads) set against face putty neatly and smoothly applied.

Note: Do not paint until putty has thoroughly hardened. See note paragraph (G-8).

(G-10) Provision for Screens

Note: Fenestra Page 26 gives suggestions for screening provisions, Include in the Carpentry Specifications the necessary clauses covering wood trim required in conjunction with screens. Space between inside screen and window must be not less than 2" to clear standard hardware. If special "Flat Type" handles are specified. (See note, paragraph [G-6c] 1" clearance only is required.) On account of the roller, rolling screens require a 2½" clearance.

(G-11) Screens

Note: On open-out ventilators, metal side hinged or vertical sliding screens may be used as desired. Rolling screens up to 6' 0" wide may be used where entire window is covered On open-in ventilators, metal, removable, fixed, outside screens may be used. Screens are not included by the Window Manufacturer and should, therefore, be provided for under another division of the specification.

(G-12) Shading

Note: All shades must be located at least 2" from the inside face of the window for hardware clearance. Clearance for screens depends upon the type selected.
Note: Shade bracket clips designed to attach by drilling and tapping two small holes at the top of each jamb section are supplied at slight added cost (see Fenestra Page 25). These clips are of sufficient depth to bring the shade bracket in the proper position and are slotted to accommodate any standard shade bracket. Shade clips cannot be used satisfactorily with rolling screens but shade brackets may be attached to the underside of screen box. Brackets of various projections may be used to clear any type of screening except where whole opening is screened. If shade bracket clips are required, so specify.

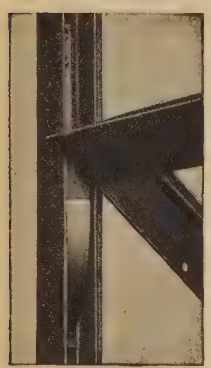
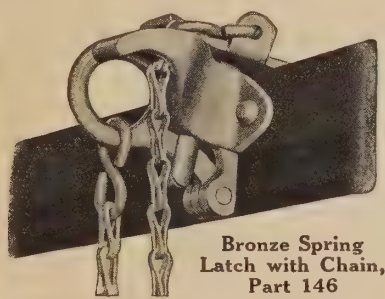


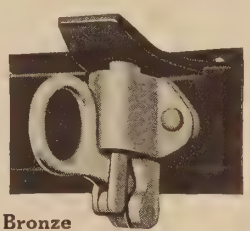
Fig. 1



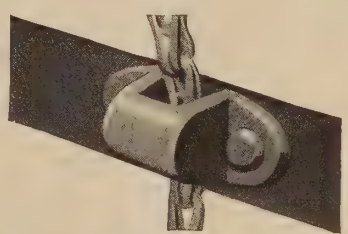
Bronze Spring Latch with Chain, Part 146

Figs. 1 and 2 show views of the alignment stop. Fig. 1, ventilator against the stop. Fig. 2, ventilator below the stop.

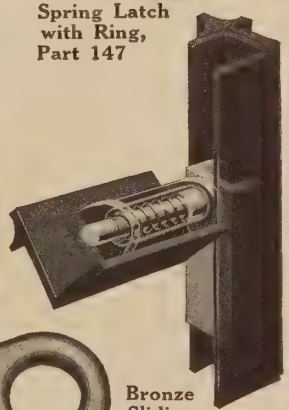
Bronze Pole Ring, Part 151



Bronze Spring Latch with Ring, Part 147



Bronze Chain Guide, Part 149



Bronze Sliding Friction Shoe

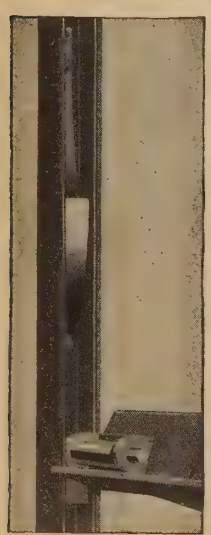
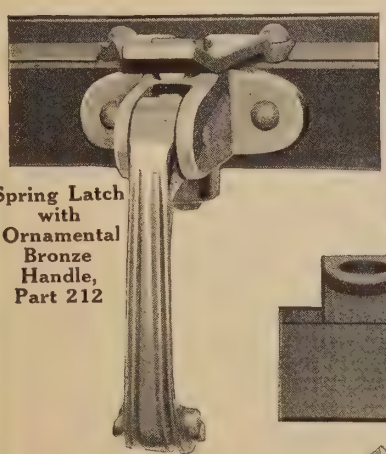
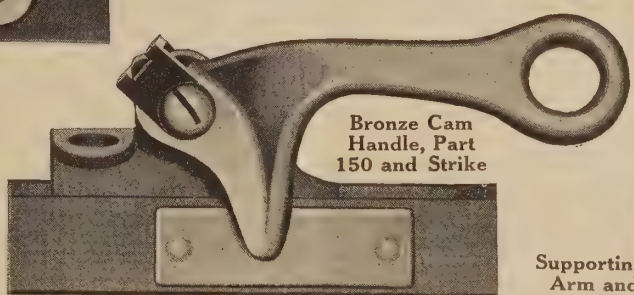


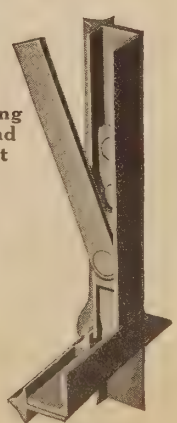
Fig. 2



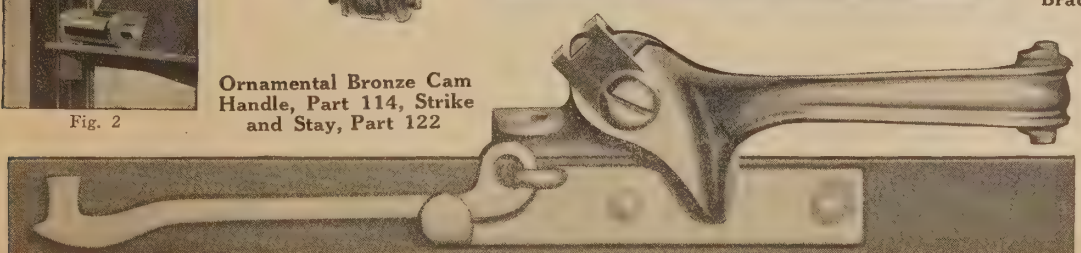
Spring Latch with Ornamental Bronze Handle, Part 212



Bronze Cam Handle, Part 150 and Strike



Supporting Arm and Bracket



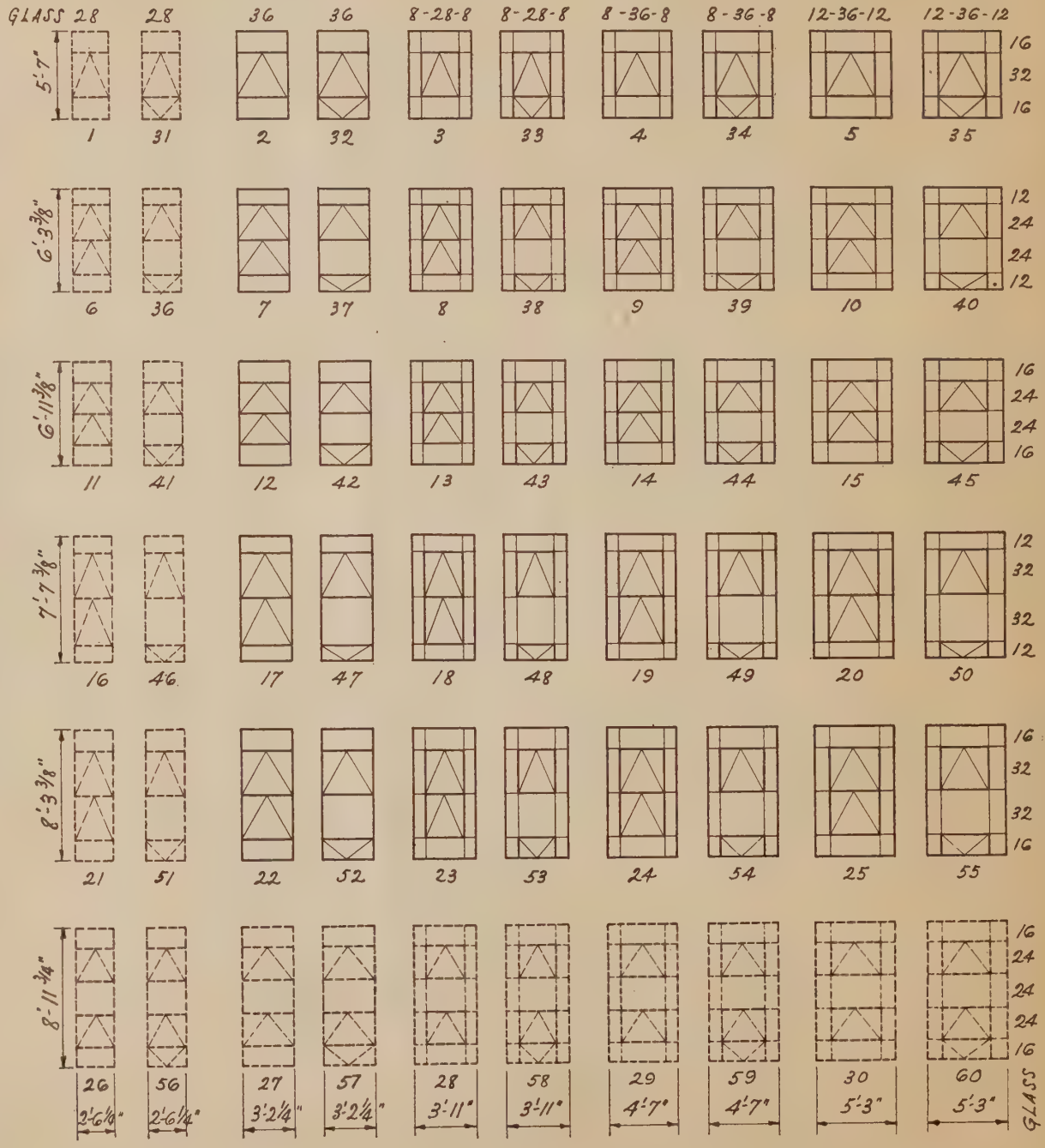
Ornamental Bronze Cam Handle, Part 114, Strike and Stay, Part 122

Architectural Projected Window Hardware

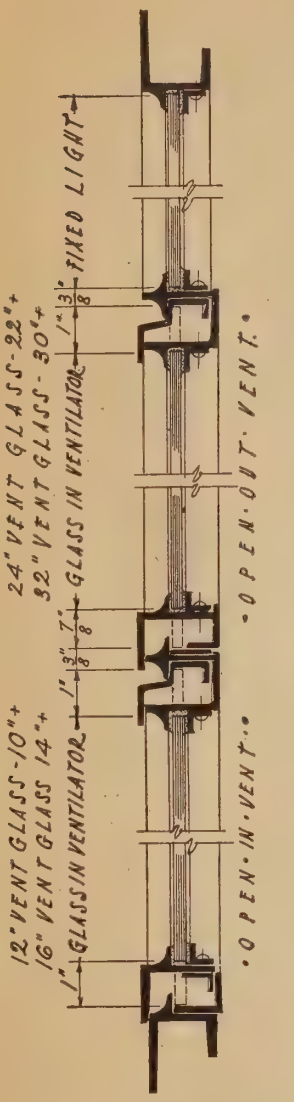
TYPES AND SIZES

FULL LINES INDICATE STANDARD TYPES — DOTTED LINES LISTED SPECIALS

GLASS SIZES GIVEN ARE FOR FIXED LIGHTS
GLASS IN VENTILATORS IS 2" LESS IN BOTH WIDTH AND HEIGHT



Fenestra, August 1927	Architectural Projected Windows Types and Sizes	Plate No. G-101

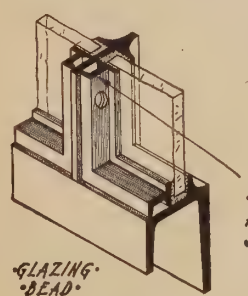


• VERTICAL •
• SECTION •

Symmetrical Combined Widths

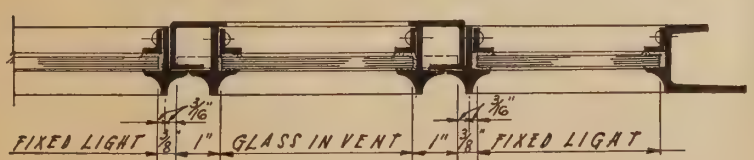
Widths	Units Wide	Lights Wide	Kind of Units Width of Lights
5′ 2½″	2	2	28/28
6′ 6½″	2	2	36/36
7′ 10¾″	3	3	28/28/28
8′ 0″	2	6	8-28-8/8-28-8
8′ 6¾″	3	3	28/36/28
9′ 2¾″	3	3	36/28/36
9′ 3½″	3	5	28/8-28-8/28
9′ 4″	2	6	8-36-8/8-36-8
9′ 10¾″	3	3	36/36/36
9′ 11½″	3	5	28/8-36-8/28
10′ 7″	4	4	28/28/28/28
10′ 7½″	3	5	28/12-36-12/28
10′ 7½″	3	5	36/8-28-8/36
10′ 8″	2	6	12-36-12/12-36-12
10′ 8¼″	3	7	8-28-8/28/8-28-8
11′ 3½″	3	5	36/8-36-8/36
11′ 4¼″	3	7	8-28-8/36/8-28-8
11′ 11″	4	4	28/36/36/28
11′ 11½″	3	5	36/12-36-12/36
12′ 0¼″	3	7	8-36-8/28/8-36-8
12′ 1″	3	9	8-28-8/8-28-8/8-28-8
12′ 8¼″	3	7	8-36-8/36/8-36-8
12′ 9″	3	9	8-28-8/8-36-8/8-28-8
13′ 3″	4	4	36/36/36/36
13′ 4¼″	3	7	12-36-12/28/12-36-12
13′ 4½″	4	8	28/8-28-8/8-28-8/28
13′ 5″	3	9	8-28-8/12-36-12/8-28-8
13′ 5″	3	9	8-36-8/8-28-8/8-36-8
14′ 0¼″	3	7	12-36-12/36/12-36-12
14′ 1″	3	9	8-36-8/8-36-8/8-36-8
14′ 8½″	4	8	36/8-28-8/8-28-8/36
14′ 8½″	4	8	28/8-36-8/8-36-8/28
14′ 9″	3	9	8-36-8/12-36-12/8-36-8
14′ 9″	3	9	12-36-12/8-28-8/12-36-12
15′ 5″	3	9	12-36-12/8-36-8/12-36-12

USE THESE WIDTH DIMENSIONS WITH ANY HEIGHT DIMENSION



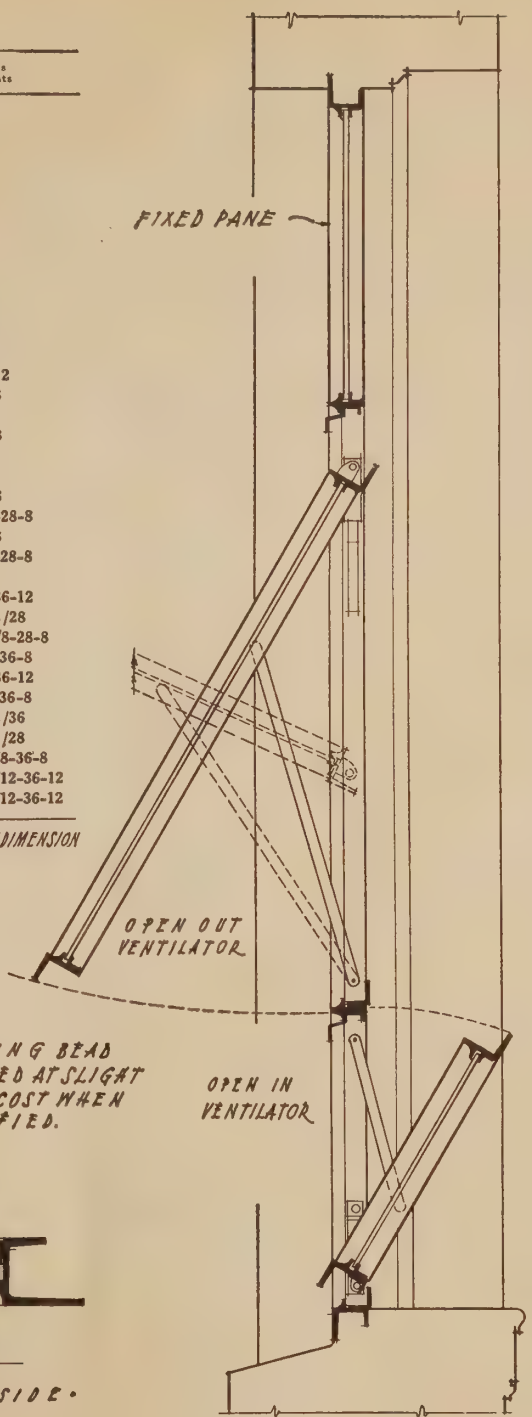
GLAZING BEAD SUPPLIED AT SLIGHT ADDED COST WHEN SPECIFIED.

• GLAZING • BEAD •



36" VENT - GLASS - 34"
28" VENT GLASS - 26"

• HORIZONTAL • SECTION •
• GLASS • SIZES • FOR • VENTILATORS •
• SCALE: 3" = 1'-0" •

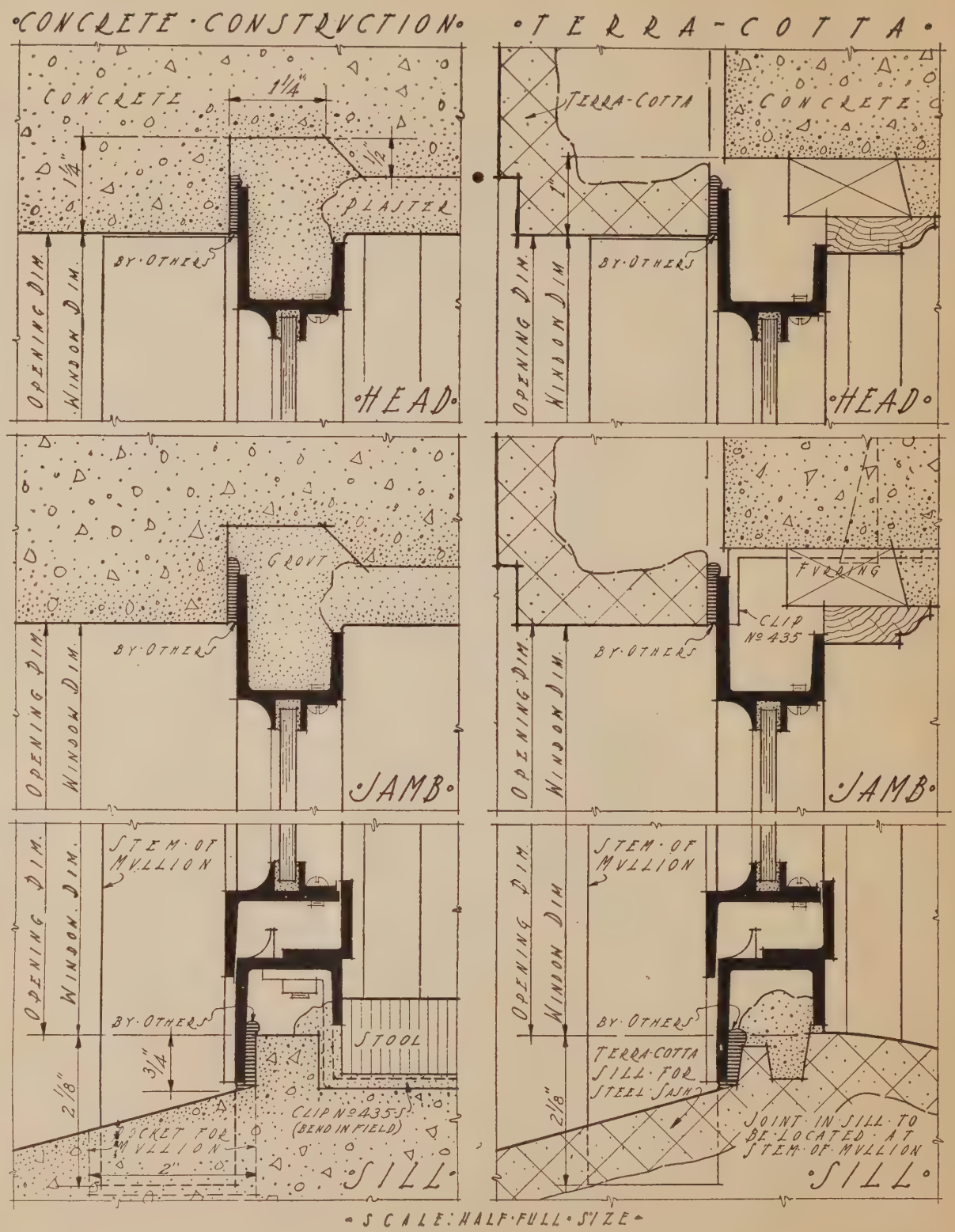


• SECTION • SHOWING •
• OPERATION • OF • VENTS •

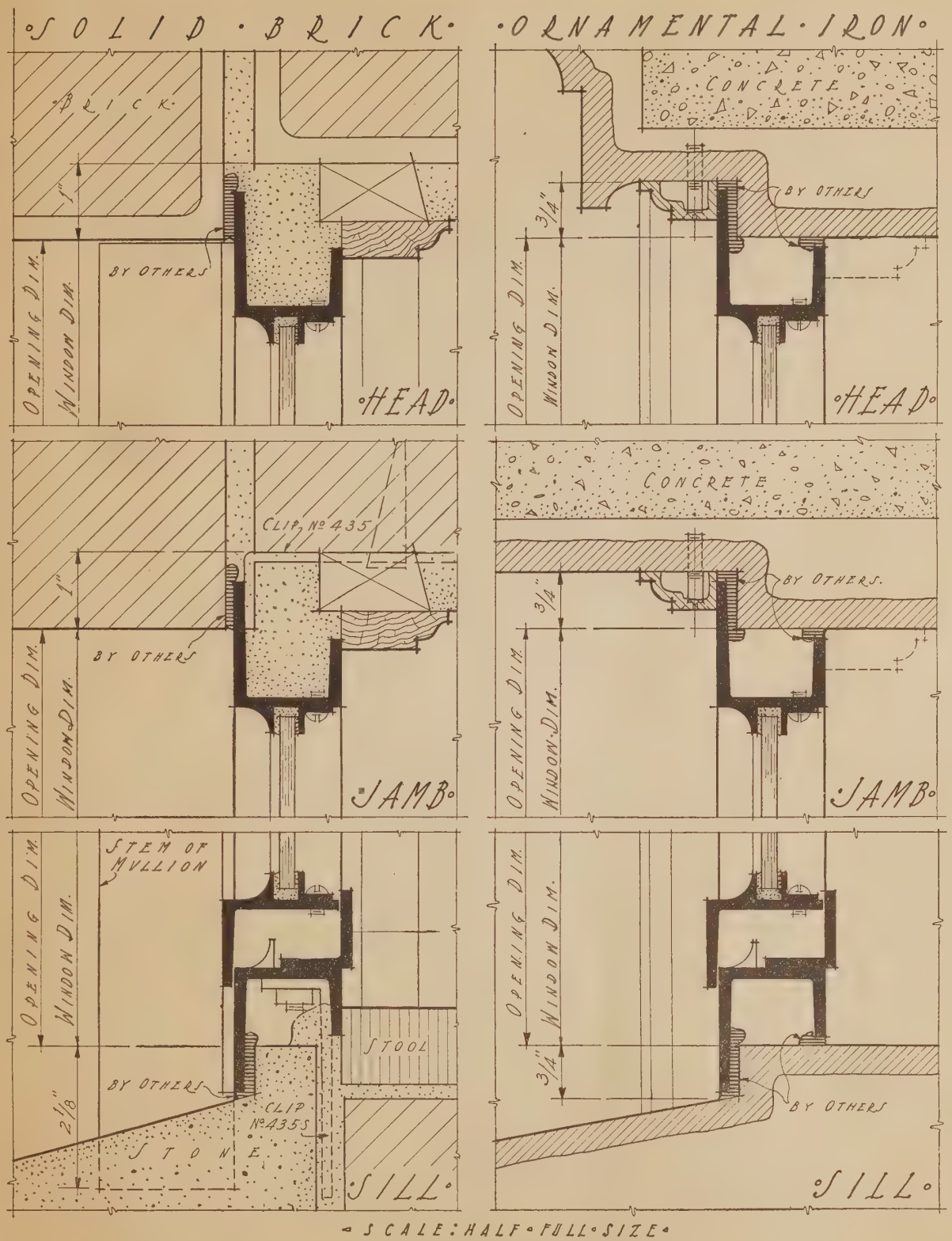
Fenestra August 1927

Architectural Projected Windows
Details and Combinations

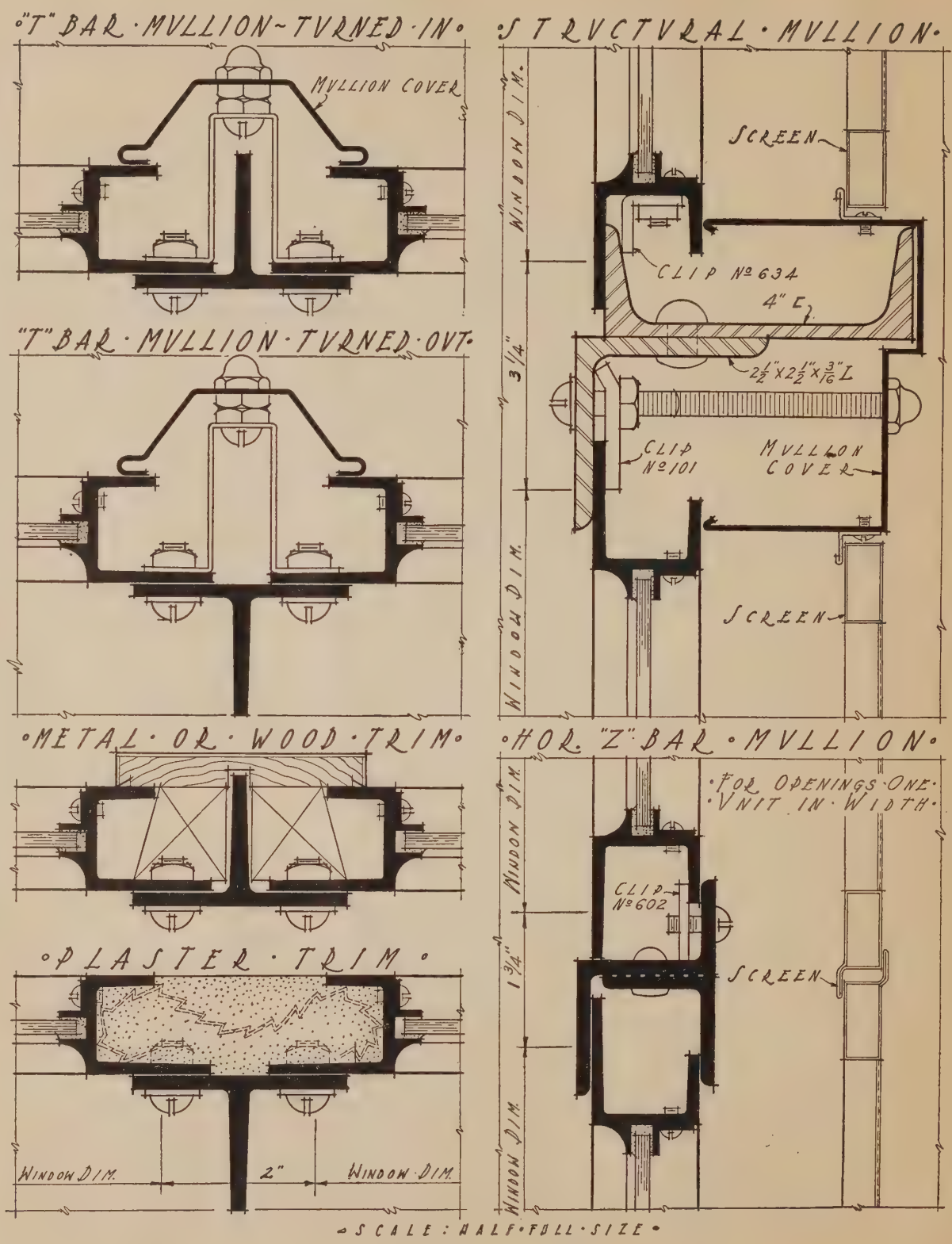
Plate No G-102



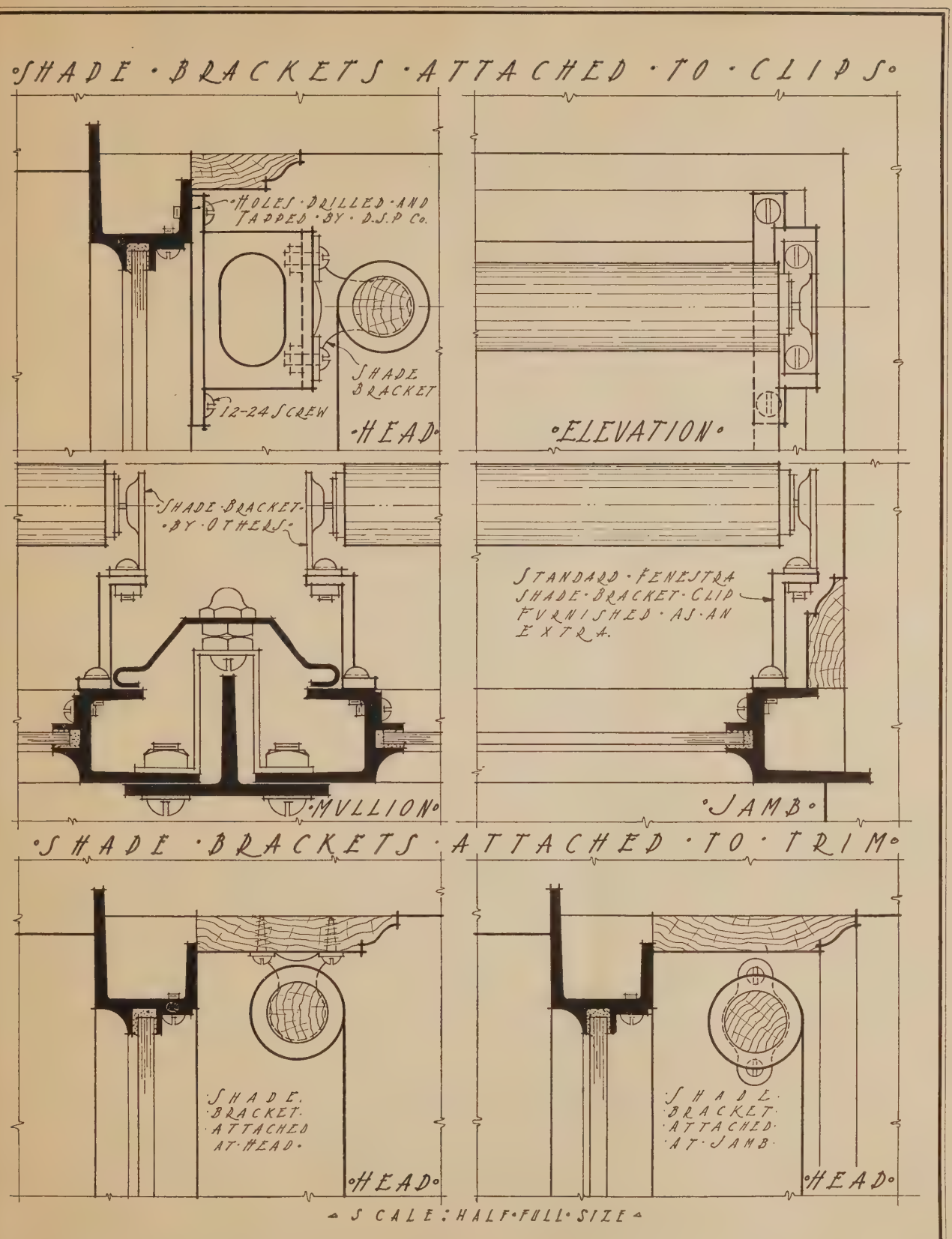
Fenestra, August 1927	Architectural Projected Windows Installation Details	Plate No G-103



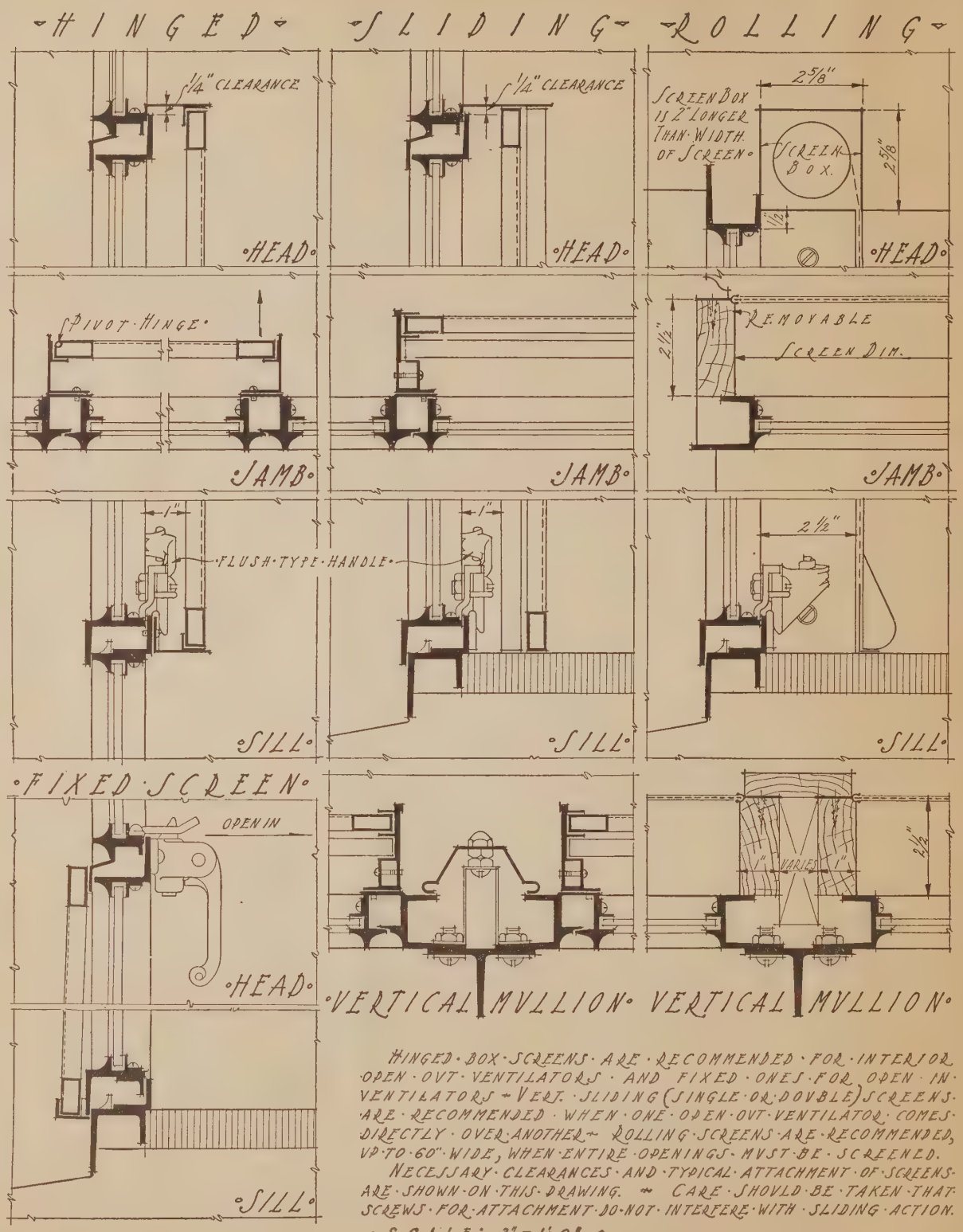
Fenestra, August 1927	Architectural Projected Windows Installation Details	Plate Nº G-104



Fenestra August 1927	Architectural Projected Windows Mullion Details	Plate Nº G-105



Fenestra August 1927	Architectural Projected Windows Shading Details	Plate No G-106



HINGED BOX SCREENS ARE RECOMMENDED FOR INTERIOR OPEN OVT VENTILATORS AND FIXED ONES FOR OPEN IN VENTILATORS — VERT. SLIDING (SINGLE OR DOUBLE) SCREENS ARE RECOMMENDED WHEN ONE OPEN OVT VENTILATOR COMES DIRECTLY OVER ANOTHER — ROLLING SCREENS ARE RECOMMENDED, UP TO 60" WIDE, WHEN ENTIRE OPENINGS MUST BE SCREENED.

NECESSARY CLEARANCES AND TYPICAL ATTACHMENT OF SCREENS ARE SHOWN ON THIS DRAWING. — CARE SHOULD BE TAKEN THAT SCREWS FOR ATTACHMENT DO NOT INTERFERE WITH SLIDING ACTION.

— SCALE:- 3" = 1'-0" —

Fenestra August 1927	*Architectural Projected Windows* Screening Details	**Plate No** G-107,

(GC) COMMERICIAL PROJECTED WINDOWS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications

Note: Commercial Projected Windows are in general design and operation similar to Architectural Projected Windows. They are made to meet the demand for a less expensive window of this type. The chief differences between the two are (1) the section of the frame member; (2) the addition of muntins dividing the window into small panes; (3) inside putty instead of glazing angles or beads; (4) use of malleable iron instead of bronze hardware.

Note: Commercial Projected Windows with "open-in" ventilators are particularly adapted to Food Products Plants since these windows may be screened economically. See Paragraphs (GC-10) and (GC-11).

Note: To avoid repetition where the specification is the same as that for the Architectural Projected Windows, this is so noted. Where not identical, use the clauses here given. For Specification for Architectural Projected Window referred to, see Fenestra Page 18.

(GC-1) Work Included

Same as (G-1).

(GC-2) General

Commercial Projected Windows shall be *Fenestra* as manufactured by DETROIT STEEL PRODUCTS COMPANY.

(GC-3) Materials

(GC-3a) Window Sections—Same as (G-3a).

(GC-3b)—Frame Members—All frame members shall be (special angle sections with protruding leg 1" deep) (special unequal leg channel sections).

Note: Select as required unequal leg channel at added cost over angle section.

(GC-3c) Muntins—Same as (G-3c).

(GC-3d) Vertical Mullions—Same as (G-3d).

(GC-3e) Horizontal Mullions—Horizontal mullions shall be standard Fenestra (hot rolled solid steel T bars) (Structural angles and channels).

Note: Specify type. Use where two or more windows are placed one above another in the same opening.

(GC-3f) Mullion Covers—Same as (G-3f).

(GC-4) Construction

(GC-4a) Frames and Ventilators—Frames and ventilators shall be mortise and tenon, air hammer riveted at all corners. Ventilators shall, in addition to riveting, be electrically welded at corners, with exposed faces ground to a smooth finish.

(GC-4b) Muntins—Same as (G-4b).

(GC-4c) Vertical Mullions—Same as (G-4d).

(GC-4d) Horizontal Mullions—Same as (G-4e).

(GC-4e) Mullion Covers—Same as (G-4f).

(GC-4f) Sill and Jamb Anchor Clips—Same as (G-4g).

(GC-5) Attached Hardware

Note: Attached at factory.

(GC-5a) Ventilator Operating Hardware—Same as (G-5b) (G-5c).

(GC-5d) Cam Handle Brackets—Where required, provide solid rolled steel Z bar brackets, triple riveted to the ventilators, for the attachment of cam handles.

(GC-6) Detached Hardware

(GC-6a) Same as G-6a).

(GC-6b) All hardware for Commercial Projected Windows shall be (malleable iron with one coat of red mineral paint) (bronze, light coinage finish).

Note: Select as required. Bronze at added cost over iron.

(GC-6d) Locking and Operating Devices—

Note: Select as required.

Note: Where ventilators are screened, special flat type handles may be secured at added cost which will permit the screen to be set 1" from the face of the window instead of 2" necessary with standard cam handles. Specify if desired.

(1) *For open-out ventilators within reach from floor*—Malleable iron cam handle attached to Z bar bracket by bolt and nut, Part 150.

(2) *For open-out ventilators beyond reach from floor*—Riveted malleable iron pole hook ring at head of ventilator, Part 151, malleable iron cam handle, Part 150, with hole for pole hook, attached to Z bar bracket by bolt and nut.

(3) *For open-in ventilators within reach from floor*—Riveted malleable iron spring latch with finger ring handle at head of ventilator, Part 147.

(4) *For open-in ventilators beyond reach from floor*—(Riveted malleable iron spring latch with endless chain, Part 146, at head of ventilator. Riveted iron chain guide, Part 149, at sill) (or) (Riveted malleable iron spring latch with pole hook ring handle, Part 147, at head).

(GC-7) Erection

Note: Include in the Masonry Specifications that all masonry openings shall be accurately constructed in accordance with the standard Fenestra installation details so that windows may be erected after masonry is completed. See Paragraph 9, Fenestra Page 1.

Note: Include in the Masonry Specifications that all mortar grouting, pointing, etc., shall be done by the Mason Contractor after windows have been erected.

(GC-7a) All Commercial Projected Windows shall be erected in prepared openings by the FENESTRA CONSTRUCTION COMPANY, under a separate contract.

Note: See Paragraph 5, Fenestra Page 1.

(GC-7b) Same as (G-7b).

(GC-7c) Same as (G-7c).

(GC-8) Painting

Same as (G-8).

(GC-9) Glass and Glazing

Note: The following should be included in the Glazing Specifications:

Note: See Paragraph 10, Fenestra Page 2.

(GC-9a) Glass—Same as (G-9a).

(GC-9b) Putty—Same as (G-9b).

(GC-9c) Glazing—All Commercial Projected Windows shall be glazed from the inside. All glass shall be set in a bed of putty and secured by copper plated, steel, spring, glazing clips furnished by the window manufacturer. Face putty shall be applied in a neat, clean-cut, smooth manner.

Note: Glazing angles are obtainable at slight added cost.

Note: Do not paint until putty has thoroughly hardened. See note Paragraph (G-8).

(GC-10) Provision for Screens

(GC-10a) For Open-out Ventilators—Same as (G-10).

(GC-10b) For Open-in Ventilators—For open-in ventilators provide permanent brackets for removable screen support.

Note: See Fenestra Page 31.

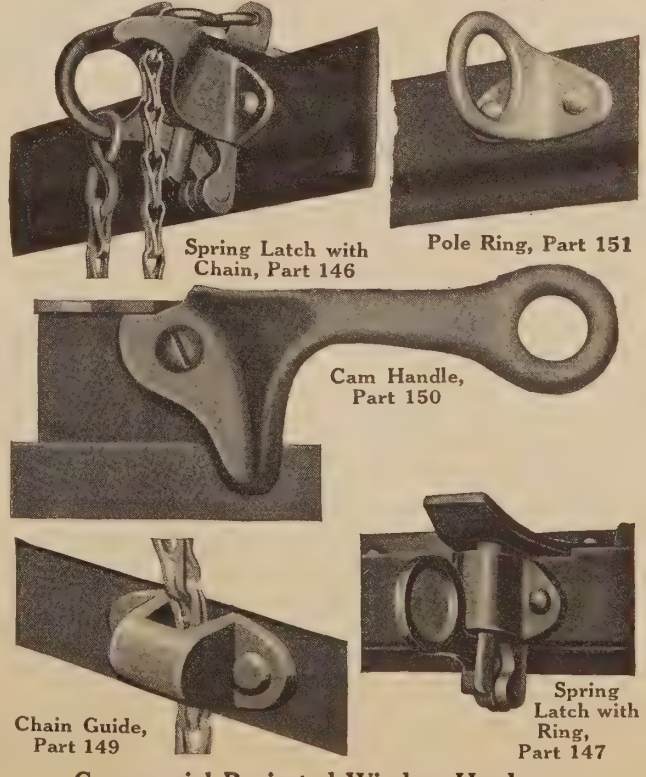
(GC-11) Screens

Same as (G-11).

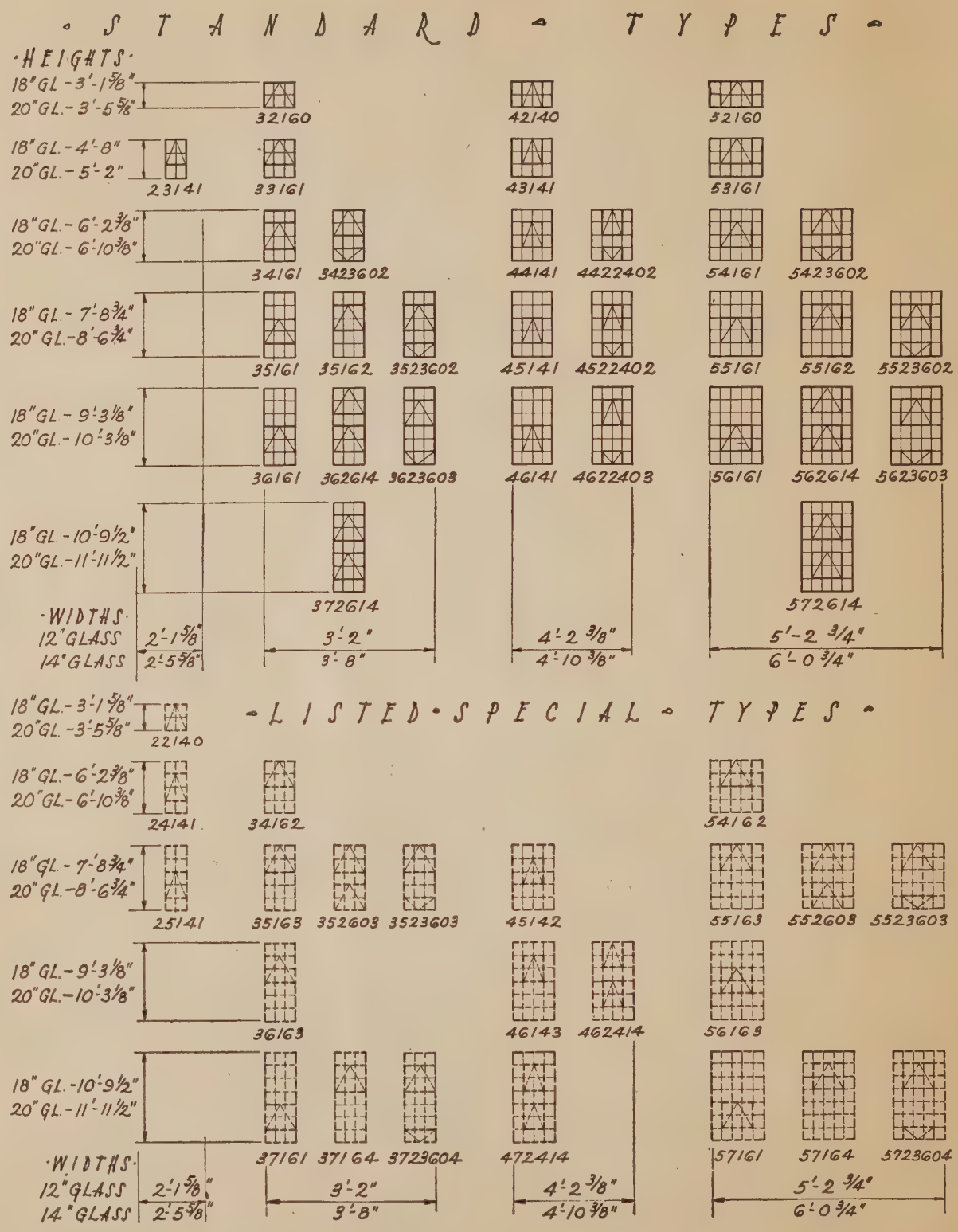
Note: Where desired for open-in ventilators, the Window Manufacturer will furnish, at reasonable added cost, removable, tubular, steel frame, rewirable screens (baked enameled finish) with No. 16 mesh bronze screen cloth. These screens are well constructed and furnished completely adapted to and fitting the ventilator opening. (See Fenestra Page 31.) If required so specify.

(GC-12) Shading

Note: Where ventilators are "open out" shade bracket clips, slotted to accommodate standard shade brackets, may be attached by drilling and tapping two small holes at the top of each jamb section of the frame. Clips are supplied at slight added cost. If required so specify.


Spring Latch with Chain, Part 146
Pole Ring, Part 151
Cam Handle, Part 150
Chain Guide, Part 149
Spring Latch with Ring, Part 147

Commercial Projected Window Hardware



Fenestra August 1927

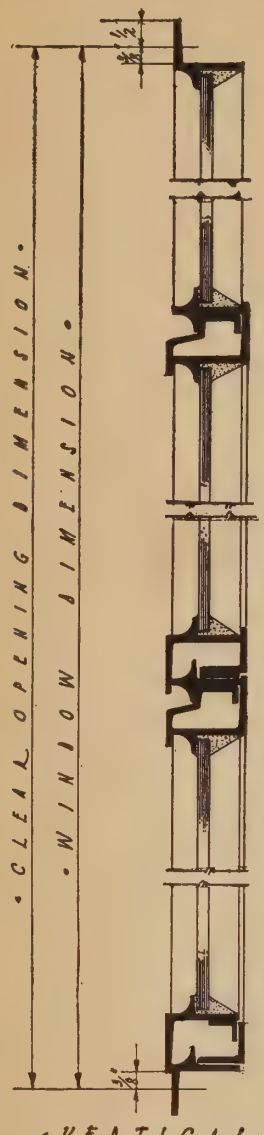
Commercial Projected Windows
Types and Sizes

Plate No G-201

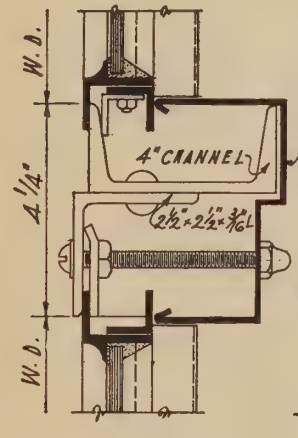
Symmetrical Combined Widths

12" x 18" Glass	14" x 20" Glass	Units Wide	Lights Wide	No. of Units and Lights Per Unit
2' 1⅝"	2' 5⅝"	1	2	2
3' 2"	3' 8"	1	3	3
4' 2⅜"	4' 10⅜"	1	4	4
4' 5¼"	5' 1¼"	2	4	2, 2
5' 2¾"	6' 0¾"	1	5	5
6' 6"	7' 6"	2	6	3, 3
8' 6¾"	9' 10¾"	2	8	4, 4
9' 10"	11' 4"	3	9	3, 3, 3
10' 7½"	12' 3½"	2	10	5,5
10' 10⅜"	12' 6⅜"	3	10	3, 4, 3
11' 10¾"	13' 8¾"	3	11	3, 5, 3
12' 11⅛"	14' 11⅛"	3	12	4, 4, 4
13' 11½"	16' 1½"	3	13	4, 5, 4
13' 11½"	16' 1½"	3	13	5, 3, 5
14' 11⅞"	17' 3⅞"	3	14	5, 4, 5
15' 2¾"	17' 6¾"	4	14	3, 4, 4, 3
16' 0¼"	18' 6¼"	3	15	5, 5, 5
17' 3½"	19' 11½"	4	16	4, 4, 4, 4
19' 4¼"	22' 4¼"	4	18	4, 5, 5, 4
20' 7½"	23' 9½"	5	19	5, 3, 3, 3, 5
21' 5"	24' 9"	4	20	5, 5, 5, 5

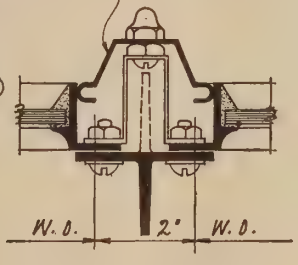
COMBINE WIDTH DIMENSIONS IN COL. 1 WITH 12"×18" GLASS HEIGHTS ONLY.
COMBINE WIDTH DIMENSIONS IN COL. 2 WITH 14"×20" GLASS HEIGHTS ONLY.



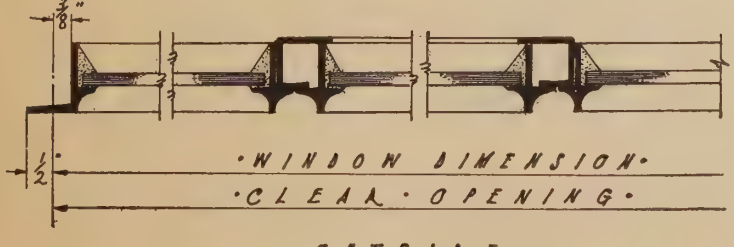
VERTICAL SECTION



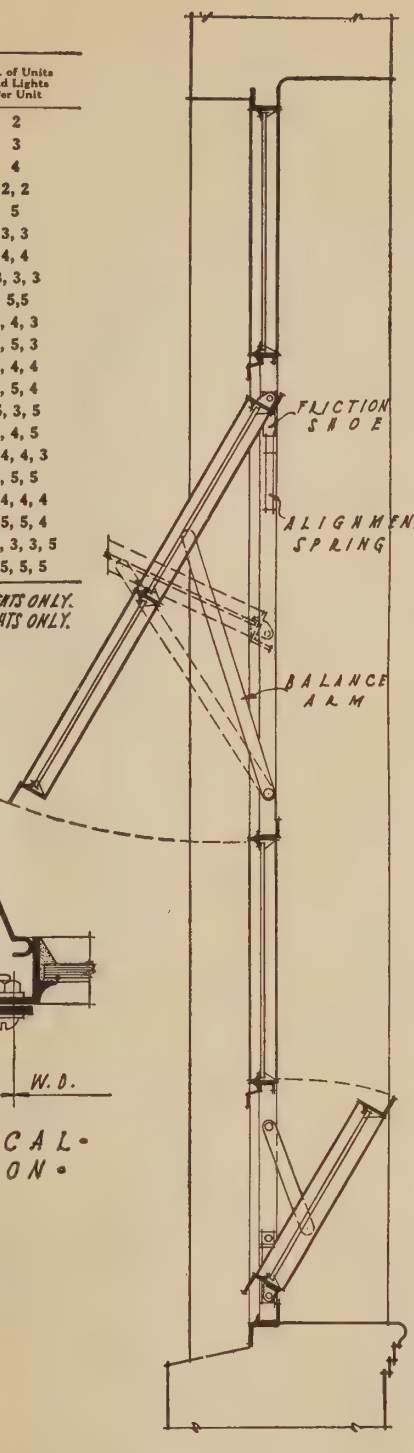
HORIZONTAL MULLION



VERTICAL MULLION

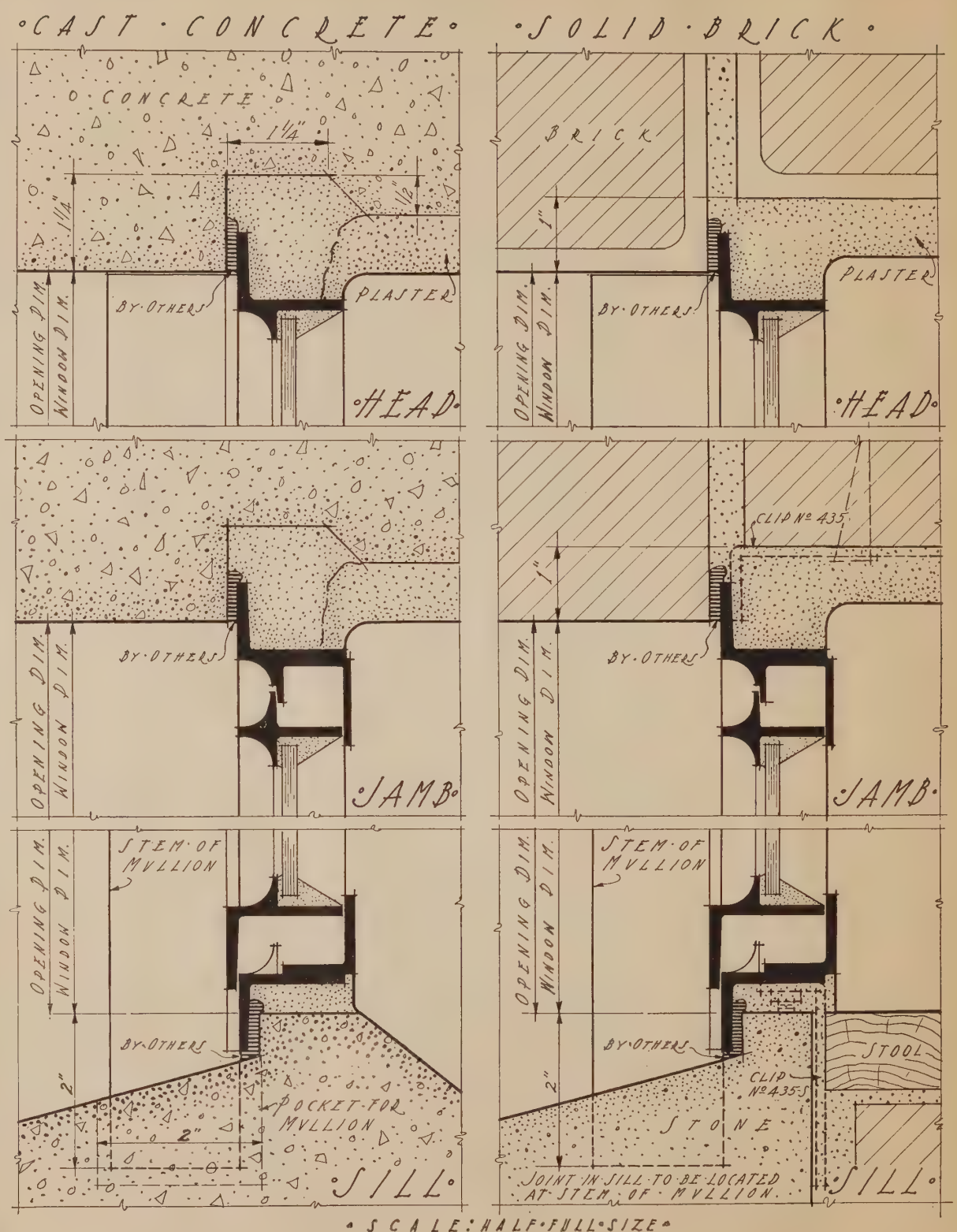


OUTSIDE
HORIZONTAL SECTION
SCALE: 3" = 1'-0"

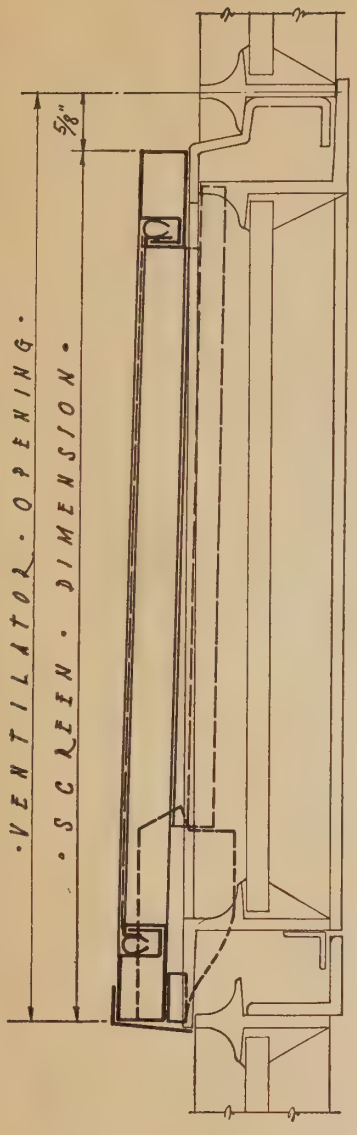


SECTION SHOWING OPERATION OF VENTS

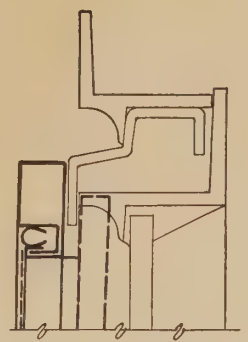
Fenestra August 1927	Commercial Projected Windows Details and Combinations	Plate No G-202



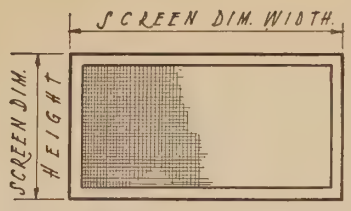
Fenestra August 1927	Commercial Projected Windows Installation Details	Plate Nº G-203



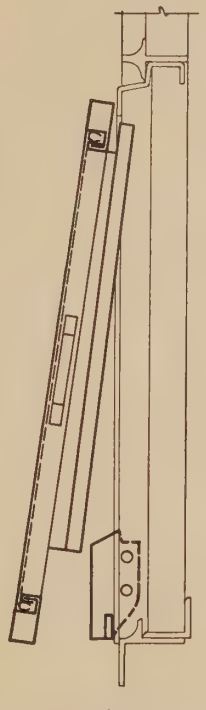
VERTICAL SECTION



DETAIL WHEN VENT COMES TO HEAD



SIZE OF VENT	SIZE OF SCREEN	
	WIDTH	HEIGHT
4 PANE 12×18	23 3/8"	36 1/8"
6 PANE 12×18	36 1/4"	36 1/8"
8 PANE 12×18	48 5/8"	36 1/8"
4 PANE 14×20	27 7/8"	40 1/8"
6 PANE 14×20	42 1/4"	40 1/8"
8 PANE 14×20	56 5/8"	40 1/8"



METHOD OF ATTACHING SCREEN TO WINDOW

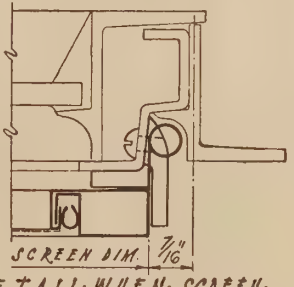
SIZES SHOWN ABOVE ARE STANDARD. ANY SIZE NOT SHOWN IS SPECIAL. SCREEN WIDTH AND HEIGHT CAN BE DETERMINED BY SUBTRACTING DIMENSIONS SHOWN ON SECTIONS, FROM THE VENTILATOR OPENING.

SCREEN FRAMES ARE MADE OF OPEN HEARTH STEEL GALVANIZED AND FINISHED IN BLACK BAKED ENAMEL. CLOTH IS OF 16 MESH OXIDIZED BRONZE WIRE AND IS WOVEN FROM #32 GAUGE BRONZE WIRE.

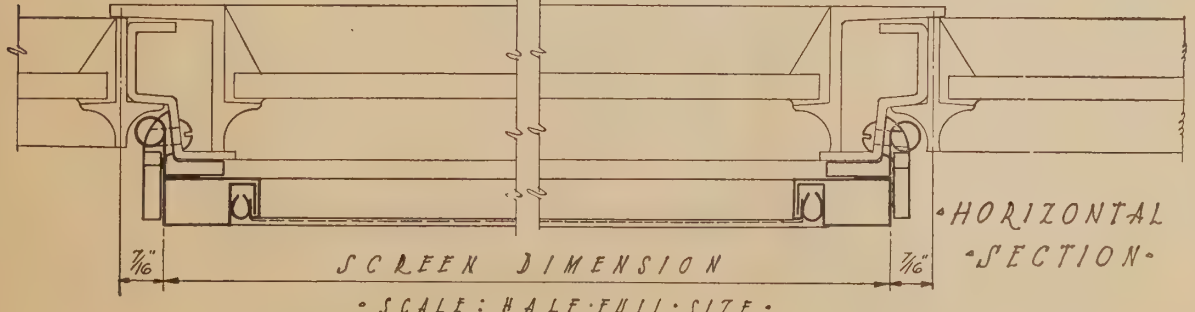
WHEN SCREENING IS SPECIFIED THE WINDOWS ARE PUNCHED IN SHOP TO RECEIVE NECESSARY CLIPS FOR HOLDING SCREENS WHILE SCREENS AND CLIPS ARE SHIPPED DIRECT FROM MANUFACTURER.

IF SCREENING IS NOT SPECIFIED AND LATER IS DESIRED, IT WILL BE NECESSARY TO DRILL HOLES FOR CLIPS IN FIELD.

FIRST-OPEN VENTILATOR SLIDE END OF BAFFLE UNDER WEATHERING.
SECOND-PUSH SCREEN UP AS FAR AS IT WILL GO.
THIRD-BRING BOTTOM OF SCREEN FRAME IN TIGHT AGAINST OUTSIDE OF WINDOW
FOURTH-PUSH SCREEN DOWN FORCING BAFFLE BACK OF LUG ON BRACKET.



DETAIL WHEN SCREEN COMES TO JAMBS



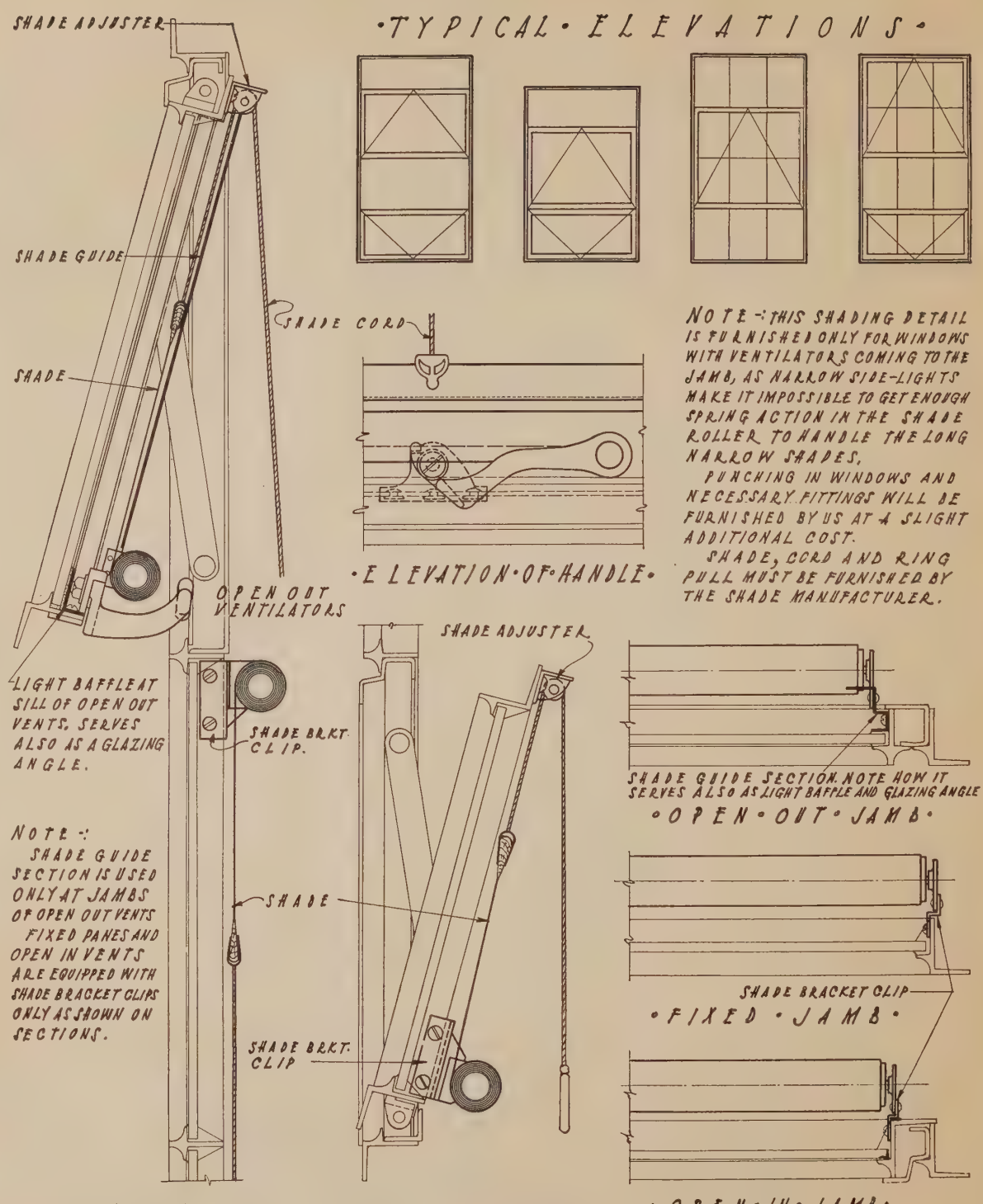
HORIZONTAL SECTION

SCALE: HALF FULL SIZE

Fenestra August 1927

Commercial Projected Windows
Screening Details

Plate No G-204


SHADE ADJUSTER
SHADE GUIDE
SHADE
SHADE CORD
OPEN OUT VENTILATORS
LIGHT BAFFLE AT SILL OF OPEN OUT VENTS. SERVES ALSO AS A GLAZING ANGLE.
SHADE BRKT. CLIP.
NOTE:
SHADE GUIDE SECTION IS USED ONLY AT JAMBS OF OPEN OUT VENTS
FIXED PANES AND OPEN IN VENTS ARE EQUIPPED WITH SHADE BRACKET CLIPS ONLY AS SHOWN ON SECTIONS.
SHADE ADJUSTER
SHADE
SHADE BRKT. CLIP
•TYPICAL• ELEVATIONS•
•ELEVATION•OF•HANDLE•
NOTE: THIS SHADING DETAIL IS FURNISHED ONLY FOR WINDOWS WITH VENTILATORS COMING TO THE JAMB, AS NARROW SIDE-LIGHTS MAKE IT IMPOSSIBLE TO GET ENOUGH SPRING ACTION IN THE SHADE ROLLER TO HANDLE THE LONG NARROW SHADES.
PUNCHING IN WINDOWS AND NECESSARY FITTINGS WILL BE FURNISHED BY US AT A SLIGHT ADDITIONAL COST.
SHADE, CORD AND RING PULL MUST BE FURNISHED BY THE SHADE MANUFACTURER.
SHADE GUIDE SECTION. NOTE HOW IT SERVES ALSO AS LIGHT BAFFLE AND GLAZING ANGLE
•OPEN•OUT•JAMB•
SHADE BRACKET CLIP
•FIXED•JAMB•
•FIXED•PANE• •OPEN•IN•VENTILATOR•
•OPEN•IN•JAMB•
•VERTICAL•SECTIONS• •HORIZONTAL•SECTIONS•
•SCALE: 3"=1'-0"•

Fenestra, *August 1927*	*Commercial Projected Windows* *Shading Details*	***Plate No*** *G-205*

(H) COUNTERBALANCED WINDOWS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications

(H-1) Work Included

Note: List and locate. (See Paragraph 13, Fenestra Page 2.)

(H-2) General

Counterbalanced Steel Windows shall be *Fenestra* as manufactured by DETROIT STEEL PRODUCTS COMPANY.

(H-3) Material

(H-3a) General—All sections, unless otherwise specially mentioned, shall be specially designed, hot rolled, solid steel sections with heavy fillets in all re-entrant angles.

(H-3b) Frames—Jambs or mullions shall be 4″ I-beam sections with flaring channel parting beads. Heads and Sills shall be heavy pressed steel sections.

Note: Jamb members serve also as mullions. No extra mullions needed.

Note: Flaring channel parting beads provide continuous "line" contacts for efficient weathering, eliminating friction produced by flat surfaces.

Note: Brass flaring channel jamb weathering may be provided at added cost to increase weathering and reduce friction. If required, so specify.

(H-3c) Sash—Stiles of sash shall be equal leg channels. Head and sill rails shall be unequal leg channels. Meeting rails shall be special channels with one leg rolled to provide a beveled, interlocking, flat contact weathering. Muntins shall be 1⅜″ deep.

Note: Muntins may be omitted for single light sash. If required, so specify.

(H-3d) Fittings—Provide malleable iron, adjustable, sill clips and meeting rail parting bead closures.

Note: Pulley housings form adjustable head clips.

(H-4) Construction

(H-4a) Frames—Parting beads shall be riveted to jambs.

Note: Brass weathering, if specified, is riveted to jambs in sash runs. If required, so specify.

Frame members shall be shipped "knocked down."

(H-4b) Sash—Stiles and rails shall be mortise and tenon, air hammer riveted and electrically welded at all corners. All exposed faces of welds shall be ground to a smooth finish. Muntins shall be mortise and tenon, air hammer riveted, at joints with sash rails.

(H-5) Hardware

Note: Hardware is shipped carefully packed to prevent damage until applied for use.

(H-5a) Pulleys and Chains—Each window shall be equipped with two roller bearings, steel pulleys mounted in a malleable iron housings.

Note: Pulley housing forms a clip for securing jambs to head and is accessible for oiling and easy removal.

Provide tension, malleable iron chain cleats cored to snugly receive three links of chain. The lower sash meeting rail cleat shall be tension adjusting. Chains shall be flat link, galvanized steel, tested to 400 pound load.

(H-5b) Locks—Meeting rail locks shall be cam action malleable iron.

(H-5c) Lifts—Lifts shall be of malleable iron attached to lower sash bottom rail with bolts and lock nuts.

Note: Bronze lifts, furnished at added cost. If required, so specify.

Note: A hole is provided in upper sash top rail for pole hook.

(H-6) Erection

Note: Include in the Masonry Specifications that all masonry openings shall be accurately constructed in accordance with the standard Fenestra installation details so that windows may be erected after masonry is completed.

Note: Include in the Masonry Specifications that all mortar grouting, painting, etc., shall be done by the Mason Contractor after windows have been erected.

(H-6a) All Counterbalanced Windows shall be erected in prepared openings by the FENESTRA CONSTRUCTION COMPANY, under a separate contract.

Note: See Paragraph 5, Fenestra Page 1.

(H-6b) Frames shall be accurately assembled in accordance with the manufacturer's directions.

All windows shall be set plumb and true, properly aligned and securely anchored before glazing.

All sash shall be properly adjusted before glazing.

(H-7) Painting

All windows shall be given one dip-coat of red mineral paint by the manufacturer before shipment.

Note: The following should be provided for in the Painting Specifications:
One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.

Note: Where desired, the FENESTRA CONSTRUCTION COMPANY (see Paragraph 5, Fenestra Page 1) at reasonable added cost will do field painting after erection. If required so specify here, including specification for paint and its application.

(H-8) Glazing

Note: The following should be included in the Glazing Specifications:

Note: See Paragraph 10, Fenestra Page 2.

Glass—Glass shall be (¼″ thick plate) (1¼″ wire of type desired) (double strength).

Note: ¼″ thick glass is recommended. Single strength glass is not recommended.

Putty—Putty shall be a high grade of steel window putty.

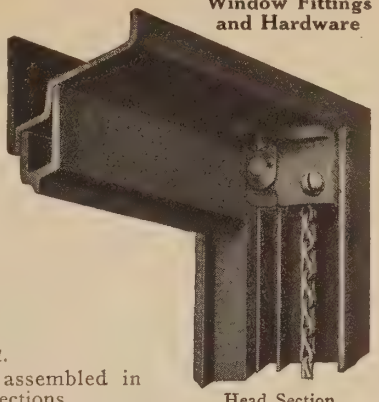
Note: Ordinary wood sash putty must not be used. See Paragraph 11, Fenestra Page 2.

Glazing—All Counterbalanced Windows shall be glazed from the inside. All glass shall be set in a bed of putty secured by copper-plated, steel, spring glazing clips furnished by the window manufacturer and face puttied in a neat and smooth manner.

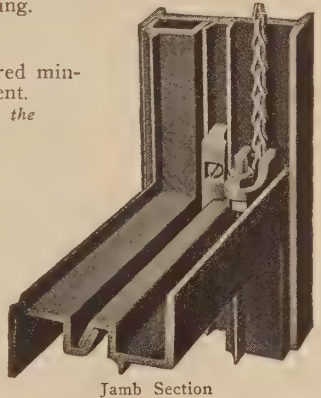
Note: Do not paint until putty has thoroughly hardened. See note Paragraph (H-7).

Note: Where single light sash are used, glass shall be secured with glazing angles. If required, so specify.

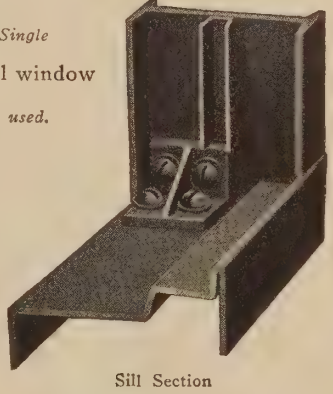
Counterbalanced Window Fittings and Hardware



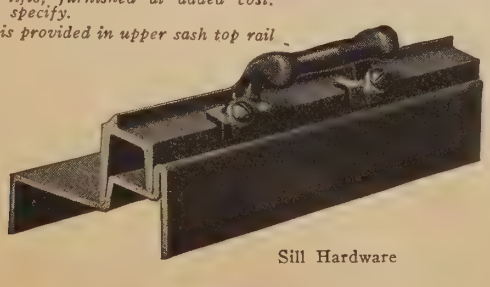
Head Section



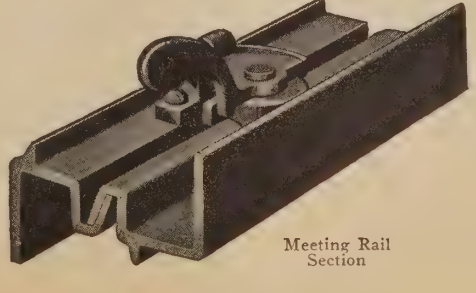
Jamb Section



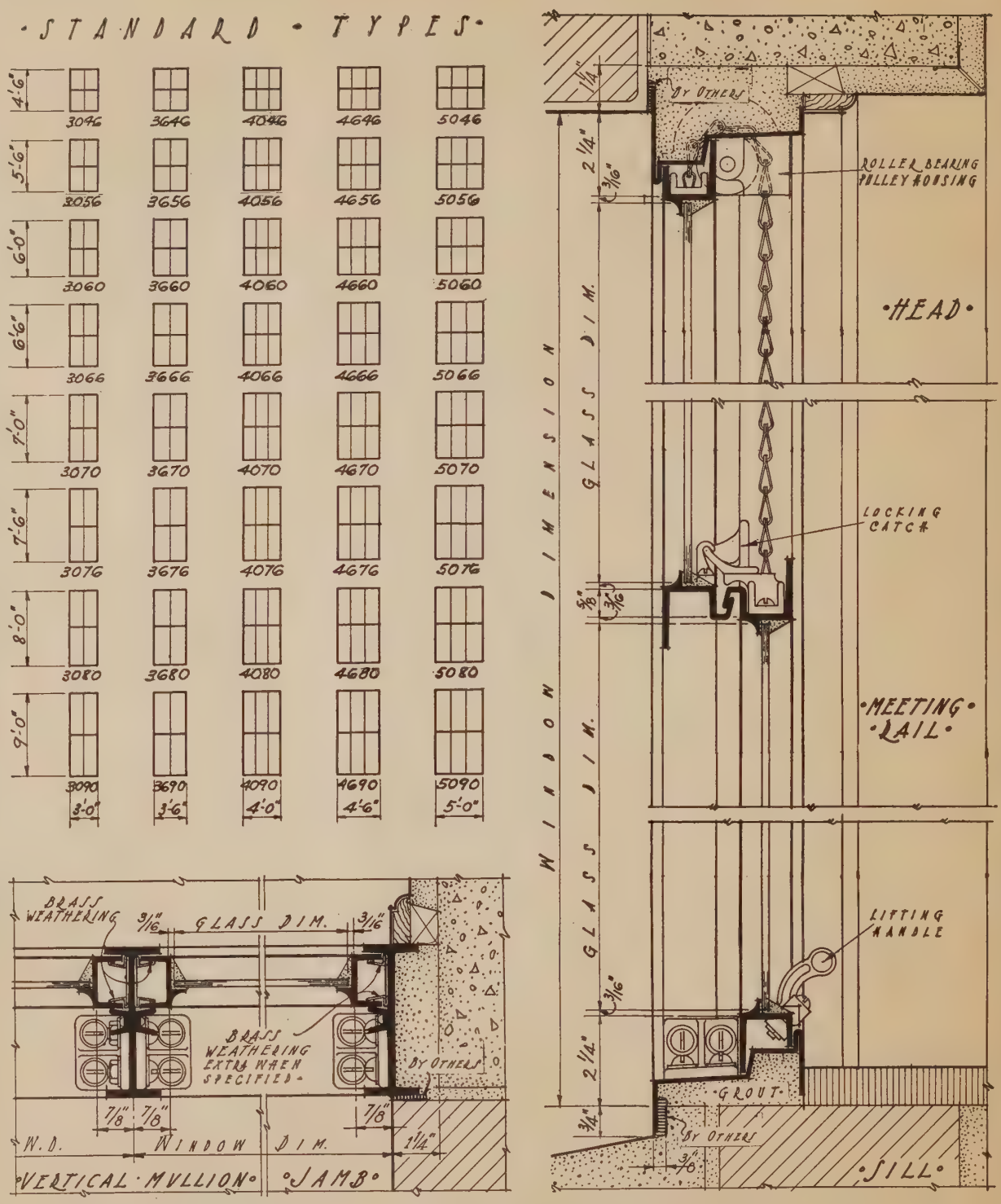
Sill Section



Sill Hardware



Meeting Rail Section



·HORIZONTAL· SECTION· ·VERTICAL·SECTION·

·SCALE: 3"-1'-0"·

Fenestra *August 1927*	*Counterbalanced Windows* *Types, Sizes and Details*	**Plate No** *H-101*

(I) INTERIOR CORRIDOR WINDOWS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications.

Note: Corridor Windows are designed primarily for office buildings as a means of daylighting and ventilating corridors and inside offices.

(I-1) Work Included

Note: List and locate. (See Paragraph 13, Fenestra Page 2.)

(I-2) General

Corridor Windows shall be *Fenestra* as manufactured by the DETROIT STEEL PRODUCTS COMPANY.

(I-3) Materials

(I-3a) Frame Sections—All frame sections shall be specially designed, hot rolled, solid steel, equal leg channel with heavy fillets in all re-entrant angles.
(I-3b) Muntins—Muntins shall be 1⅝" deep.

(I-4) Construction

(I-4a) Frames and Ventilators—Frames and ventilators shall be mortise and tenon, air hammer riveted and electrically welded at all corners. All exposed faces at welds shall be ground to a smooth finish.
(I-4b) Muntins—Muntins shall be mortise and tenon, air hammer riveted.
(I-4c) Jamb Anchor Clips—Furnish steel jamb anchor clips with bolts to attach to frame as required.

(I-5) Attached Hardware

(I-5a) Ventilator Operating Hardware—All ventilators shall swing in from the top while sliding up from the bottom and shall be equipped with standard Fenestra supporting arms and friction shoes as used in Fenestra Projected Windows.

Note: See "Open In" Architectural Projected Windows, Paragraph (G-5a) Fenestra Page 18.

(I-6) Detached Hardware

Each ventilator shall have one riveted, malleable iron spring latch with pole hook ring handle, part 147, and riveted steel strike. See Fenestra Page 27.

Note: Bronze hardware may be had at slight added cost.

(I-7) Erection

Note: Include in the Masonry Specifications that all masonry openings shall be constructed in accordance with standard Fenestra installation details and that the Mason Contractor shall do all pointing, mortar grouting, etc., after windows have been erected.

(I-7a) All corridor windows shall be erected in prepared openings by the FENESTRA CONSTRUCTION COMPANY under separate contract.
(I-7b) All corridor windows shall be set plumb and true, properly aligned and securely anchored before glazing.

(I-8) Painting

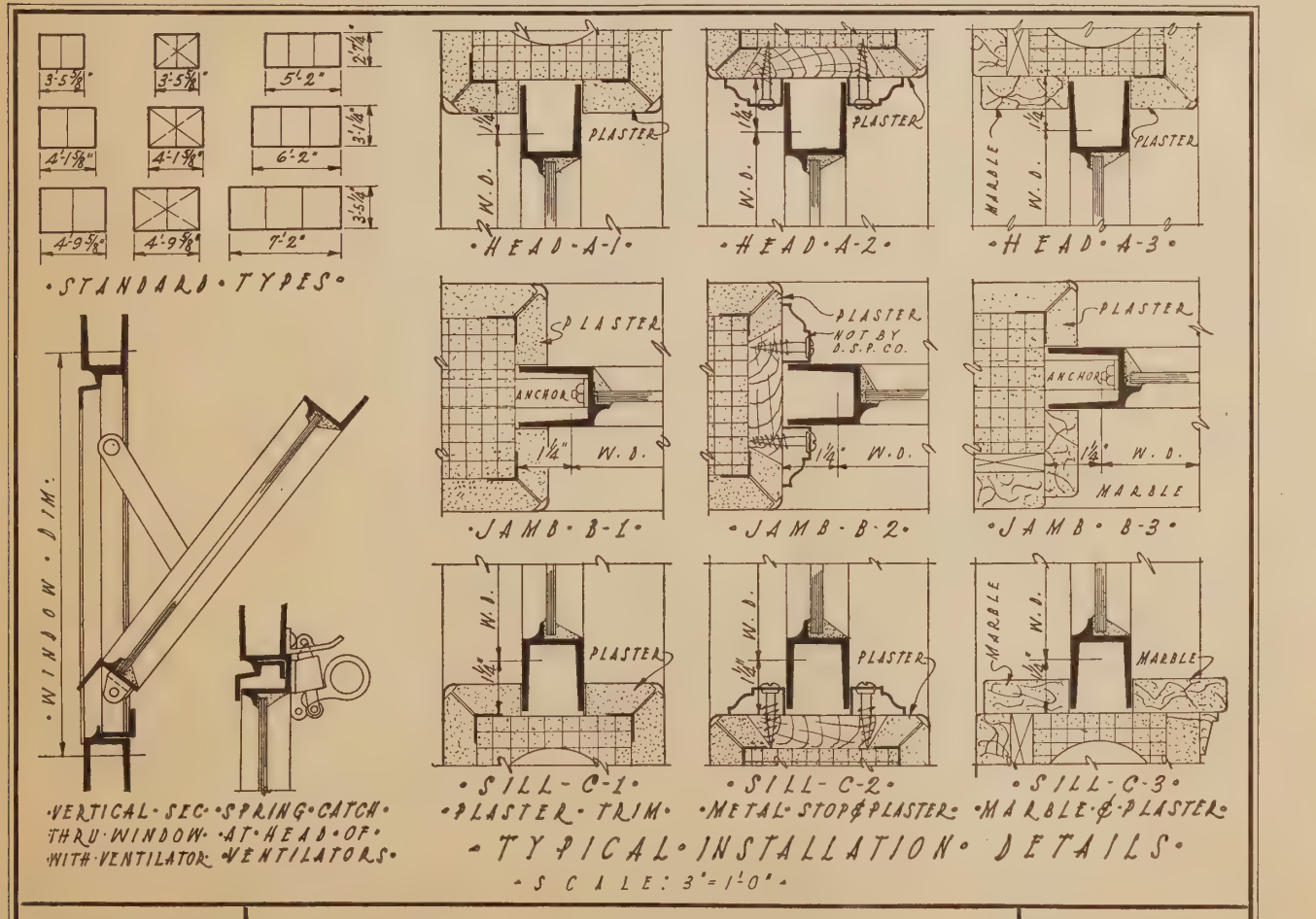
All corridor windows shall be given one dip coat of red mineral paint by the manufacturer before shipment.

Note: See Paragraph (G-8) Fenestra, Page 19.

(I-9) Glass and Glazing

Note: See Paragraph (G-9a) and (G-9b) Fenestra Page 19.

(I-9a) Glazing—All glass shall be set in a bed of high grade steel window putty, held by copper plated spring glazing clips furnished by the window manufacturer and face puttied in a neat and smooth manner.



Fenestra, August 1927	Interior Corridor Windows Types, Sizes and Details	Plate No. I-101

(L) HORIZONTALLY PIVOTED WINDOWS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications.

(L-1) Work Included

Note: List and locate. (See Paragraph 13, Fenestra Page 2.)

(L-2) General

Horizontally Pivoted Windows shall be *Fenestra* as manufactured by DETROIT STEEL PRODUCTS COMPANY.

(L-3) Materials

(L-3a) Window Sections—All sections shall be specially designed, hot rolled, solid steel bars with heavy fillets in all re-entrant angles.

(L-3b) Frame Members—All frame members shall be special angle sections.

(L-3c) Muntins—Muntins shall be 1⅜" deep.

(L-3d) Vertical Mullions—Vertical mullions shall be standard Fenestra hot rolled, solid steel T bars.

Note: Use where two or more windows are placed side by side in the same opening.

(L-3e) Horizontal Mullions—

Note: Horizontal structural mullions are not furnished by the window manufacturer. Include structural steel horizontal mullions in Structural Steel Specifications.

(L-4) Construction

(L-4a) Frames and Ventilators—Frames and ventilators shall be mortise and tenon, air hammer riveted, at all corners. Provide continuous two point, flat-contact weathering between ventilators and frames.

(L-4b) Muntins—Muntin bars shall be continuous from head to sill and from jamb to jamb, so interlocked as to increase their strength at the point of intersection. Joints at frames shall be mortise and tenon, air hammer riveted.

Note: Intersections of muntins are made as illustrated on Fenestra Page 44. An exclusive Fenestra feature.

(L-4c) Vertical Mullions—Where two or more windows are placed side by side in the same opening, provide vertical mullions with bolts for frame attachment.

(L-4d) Structural Steel Clips—Furnish in types adapted to conditions, all necessary clips and bolts for attaching windows to structural steel.

Note: All structural steel is furnished by others. Include in steel specifications all punching to accommodate clips. Where masonry work will interfere with installation of clips at time windows are erected, provide that clip bolts be included and attached by the steel contractor.

(L-4e) Sill and Jamb Anchor Clips—Furnish steel (sill) (jamb) anchor clips with bolts to be attached in the field.

(L-5) Attached Hardware

Note: Attached at factory.

(L-5a) Ventilator Pivots—All ventilators shall be horizontally pivoted and supported by external, adjustable, special, solid rolled, steel butts double machine riveted through window bars and weathering.

Note: Butts are set 2" above center unless otherwise specified. Butts may be set 4" below ventilator top where windows are required to be relatively rain protecting when open or where center pivoting would throw the upper half of the sash in conflict with piping, sway bracing or other interior obstructions. If required, so specify.

All butts shall have ⅝" solid steel bolts equipped with washers and nuts; each pin shouldered to insure constant, free and easy ventilator operation.

(L-5b) Operator Provisions—All ventilators shall be provided with solid rolled steel Z bar brackets, triple machine riveted to ventilator sill for attachment of operating hardware.

(L-6) Detached Hardware

Note: See Fenestra Page 44.

(L-6a) All detached hardware shall be shipped carefully packed to prevent damage until applied for use.

Note: Select type desired.

(L-6b) Provide malleable iron cam latches and rolled steel stay bars.

(L-6c) Provide malleable iron cam latches, chain, chain catches and pulley brackets.

(L-7) Mechanical Operators

Note: Specifications for mechanical operators are given on Fenestra Pages 55 to 59.

(L-8) Erection

Note: Include in the Masonry Specifications that all masonry openings shall be accurately constructed in accordance with the standard Fenestra installation details so that windows can be erected in prepared opening. (See Fenestra Page 37.)

Note: Include in the Masonry Specifications that all mortar grouting, pointing, etc., shall be done by the Mason Contractor after windows have been erected.

(L-8a) All Horizontally Pivoted Windows shall be erected in preparing openings by the FENESTRA CONSTRUCTION COMPANY, under a separate contract.

Note: See Paragraph 5, Fenestra Page 1.

(L-8b) All windows shall be set plumb and true, properly aligned and securely anchored before glazing.

Standard Fenestra sill anchors shall be used under the following conditions: (Use 2 clips for windows up to 6'-6" wide and 4 clips for windows over 6'-6").

(1) In all cases where a ventilator comes at the sill of the window, regardless of the window width.

(2) In all cases where the window is over 5'-0" wide, regardless of the location of the ventilators.

(3) In all multiple unit openings where mullions are not anchored into the sills.

All ventilators shall be properly adjusted before glazing.

(L-8c) Apply all hardware in accordance with the manufacturer's directions.

(L-9) Painting

All windows shall be given one dip-coat of red mineral paint by the manufacturer before shipment.

Note: The following should be provided for in the Painting Specifications:
One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.

Note: Where desired, the FENESTRA CONSTRUCTION COMPANY (see Paragraph 5, Fenestra Page 1) at a reasonable added cost, will do field painting after erection. If required, so specify here, including specification for paint and its application.

(L-10) Glass and Glazing

Note: The following should be included in the Glazing Specifications:

Note: See Paragraph 10, Fenestra Page 2.

(L-10a) Glass—Glass shall be (¼" rough wire) (¼" factory ribbed) (⅛" factory ribbed) (double strength).

Note: ¼" thick glass is recommended. Single strength glass is not recommended.

(L-10b) Putty—Putty shall be a high grade of steel window putty.

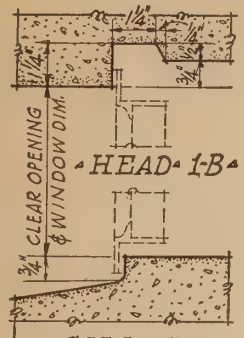
Note: Ordinary wood sash putty must not be used. See Paragraph 11, Fenestra Page 2.

(L-10c) Glazing—All Horizontally Pivoted Windows shall be glazed from the inside. All glass shall be set in a bed of putty and secured by copper plated, steel spring, glazing clips furnished by the window manufacturer. (4 clips for each fixed light and 6 for each ventilator light.) Face putty shall be applied in a neat, clean-cut, smooth manner.

Note: Do not paint until putty has thoroughly hardened. See note paragraph (L-9).

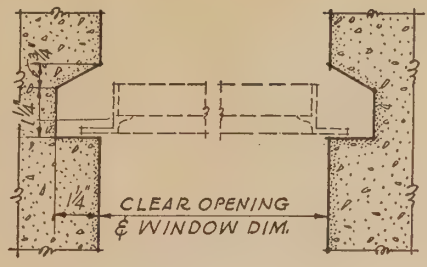
(L-11) Screens

Note: Special metal pivoted ventilator screens may be used. These lie close to the ventilator, the upper half outside, the lower half inside, with insect-proof closures at ventilator pivot line. For suggested screening details, see Fenestra Page 45. Screens are not ordinarily included by the window manufacturer and should, therefore, be provided for under another division of the specification.

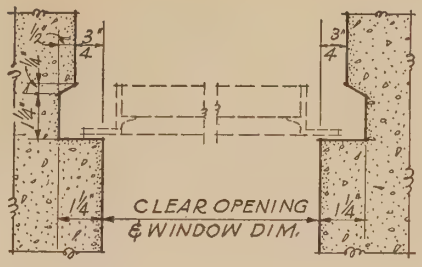


HEAD-1-B

SILL-3

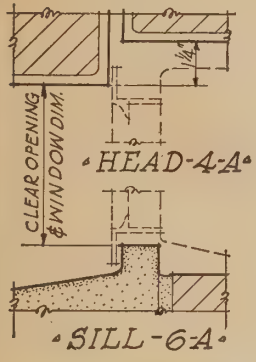


JAMB-2 FOR MULTIPLE UNITS ONLY



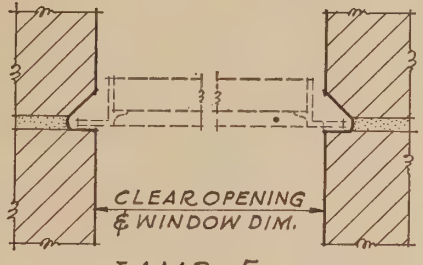
JAMB-2-A FOR SINGLE OR MULTIPLE UNITS

INSTALLATION IN CONCRETE

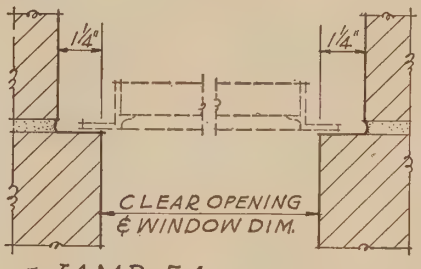


HEAD-4-A

SILL-6-A

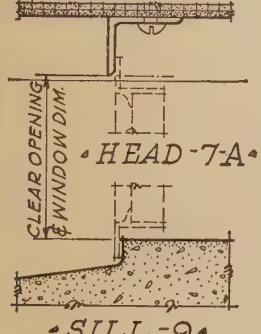


JAMB-5 FOR MULTIPLE UNITS ONLY



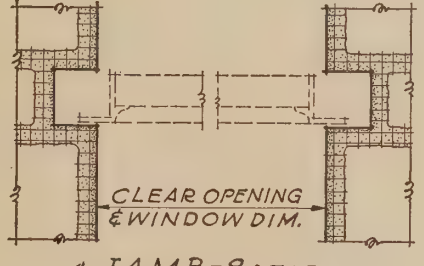
JAMB-5-A FOR SINGLE OR MULTIPLE UNITS

INSTALLATION IN BRICK

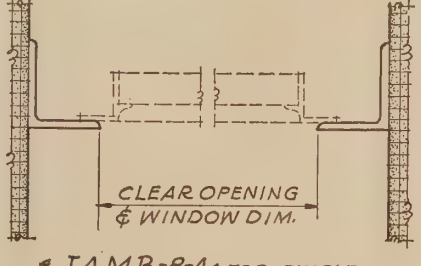


HEAD-7-A

SILL-9

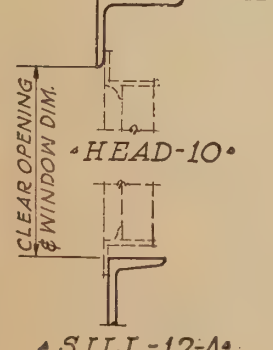


JAMB-8 FOR MULTIPLE UNITS ONLY



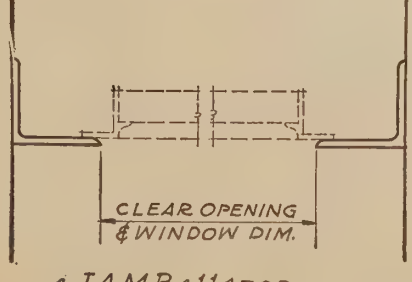
JAMB-8-A FOR SINGLE OR MULTIPLE UNITS

INSTALLATION IN TILE



HEAD-10

SILL-12-A



JAMB-11 FOR MULTIPLE UNITS ONLY

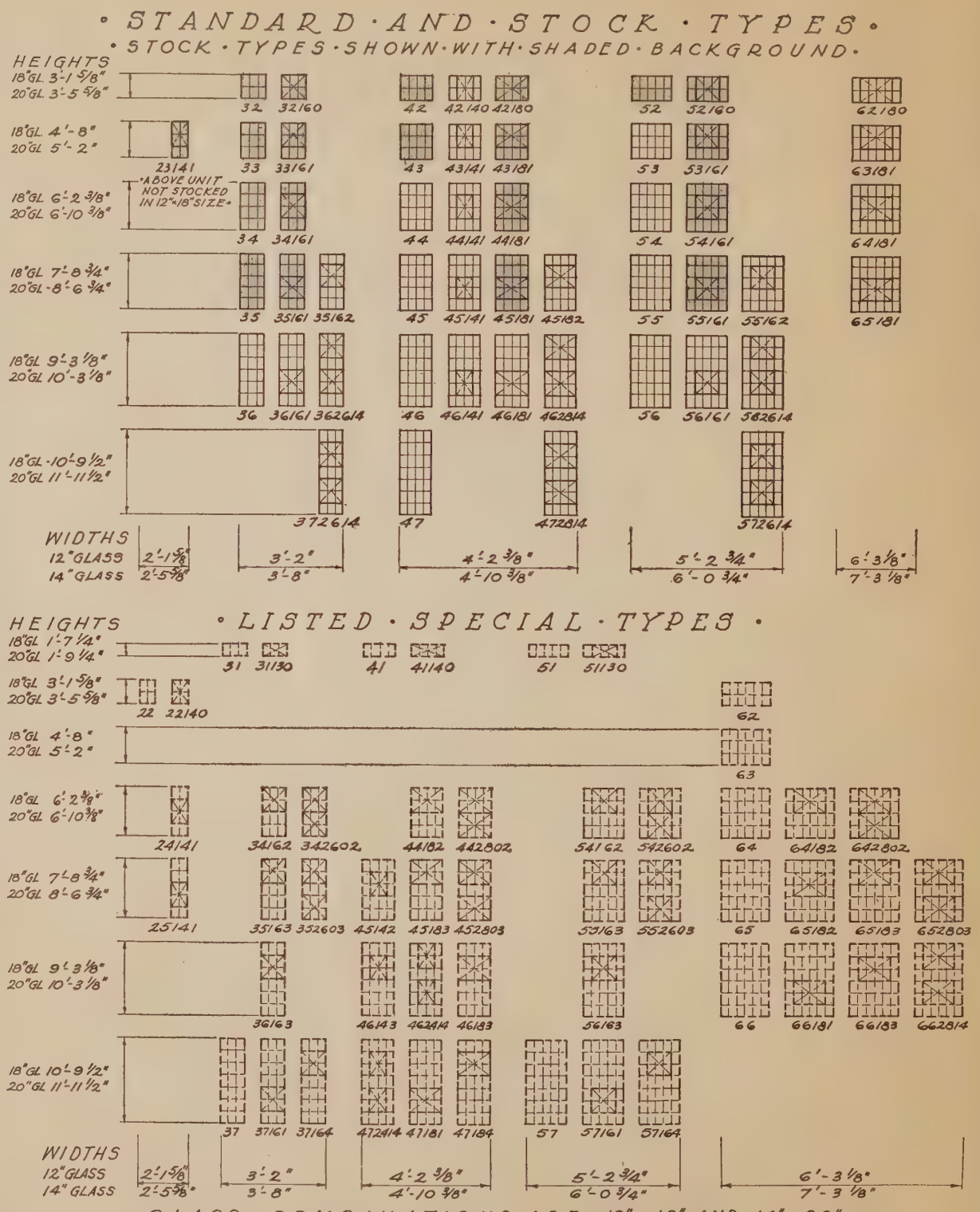
INSTALLATION IN STEEL

NOTE-:

WE STRONGLY RECOMMEND THE INSTALLATION OF FENESTRA SIDEWALL WINDOWS AFTER THE WALLS OF BUILDING ARE PRACTICALLY COMPLETED.

IN EVERY CASE, REGARDLESS OF WHETHER SINGLE UNITS OR COMBINATIONS OF UNITS ARE TO BE USED, THE OPENING SHOULD BE PREPARED IN ACCORDANCE WITH THE DIMENSIONS SHOWN IN THE INSTALLATION DETAILS ON PLATES L-104 & L-105. REBATES AND ANGLES SHOWN HAVE BEEN ACCEPTED BY BUILDERS AND CONTRACTORS AS THE BEST PRACTICE AND THESE SHOULD BE CLOSELY FOLLOWED.

Fenestra, August 1927	Horizontally Pivoted Windows Prepared Openings	Plate No. L-101



Fenestra
August 1927

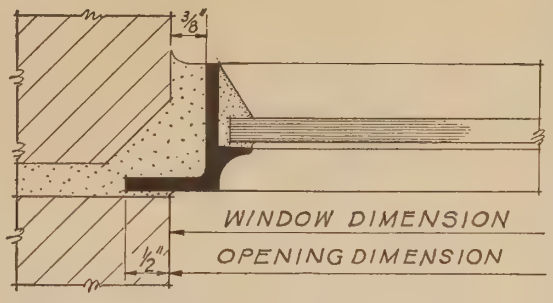
Horizontally Pivoted Windows
Types and Sizes

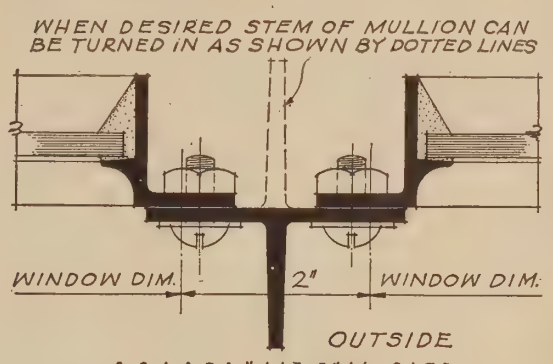
Plate No
L-102

SYMMETRICAL COMBINATIONS

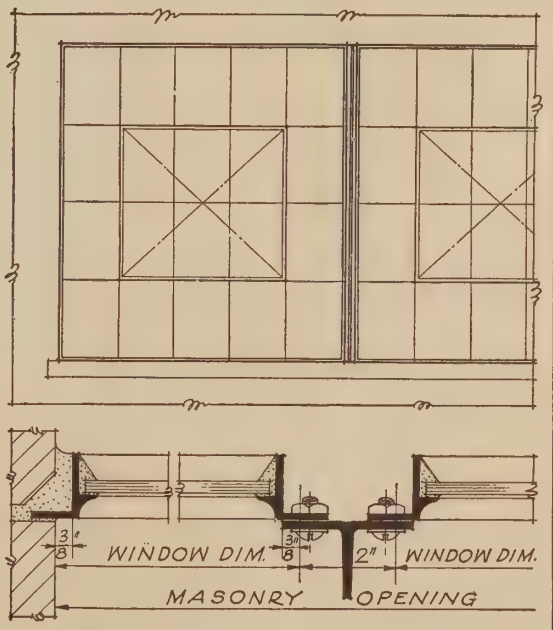
OPENING DIMENSIONS				NO. UNITS IN OPENING	NO. LIGHTS IN OPENING	ARRANGEMENT OF UNITS IN OPENING. FIGURES INDICATE THE NUMBER OF LIGHTS IN WIDTH OF EACH UNIT.
18" HEIGHTS		20" HEIGHTS				
PANES	DIM.	PANES	DIM.			
2	3'-1 7/8"	2	3'-5 5/8"			
3	4'-8"	3	5'-2"			
4	6'-2 3/8"	4	6'-10 3/8"			
5	7'-8 3/4"	5	8'-6 3/4"			
6	9'-3 1/8"	6	10'-3 1/8"			
7	10'-9 1/2"	7	11'-11 1/2"			
12" WIDTHS		14" WIDTHS				
* 2'-1 5/8"		* 2'-5 5/8"		1	2	2
3'-2"		3'-8"		1	3	3
4'-2 3/8"		4'-10 3/8"		1	4	4
4'-5 1/4"		5'-1 1/4"		2	4	2,2
5'-2 3/4"		6'-0 3/4"		1	5	5
6'-3 1/8"		7'-3 1/8"		1	6	6
6'-6"		7'-6"		2	6	3,3
8'-6 3/4"		9'-10 3/4"		2	8	4,4
9'-10"		11'-4"		3	9	3,3,3
10'-7 1/2"		12'-3 1/2"		2	10	5,5
10'-10 3/8"		12'-6 3/8"		3	10	3,4,3
11'-10 3/4"		13'-8 3/4"		3	11	3,5,3
11'-10 3/4"		13'-8 3/4"		3	11	4,3,4
12'-8 1/4"		14'-8 1/4"		2	12	6,6
12'-11 1/8"		14'-11 1/8"		3	12	4,4,4
13'-2"		15'-2"		4	12	3,3,3,3
13'-11 1/2"		16'-1 1/2"		3	13	4,5,4
13'-11 1/2"		16'-1 1/2"		3	13	5,3,5
14'-11 7/8"		17'-3 7/8"		3	14	4,6,4
14'-11 7/8"		17'-3 7/8"		3	14	5,4,5
15'-2 3/4"		17'-6 3/4"		4	14	3,4,4,3
16'-0 1/4"		18'-6 1/4"		3	15	5,5,5
16'-0 1/4"		18'-6 1/4"		3	15	6,3,6
16'-6"		19'-0"		5	15	3,3,3,3,3
17'-0 5/8"		19'-8 5/8"		3	16	5,6,5
17'-0 5/8"		19'-8 5/8"		3	16	6,4,6
17'-3 1/2"		19'-11 1/2"		4	16	4,4,4,4
17'-3 1/2"		19'-11 1/2"		4	16	3,5,5,3
17'-6 3/8"		20'-2 3/8"		5	16	3,3,4,3,3
18'-1"		20'-11"		3	17	6,5,6
18'-6 3/4"		21'-4 3/4"		5	17	3,4,3,4,3
19'-1 3/8"		22'-1 3/8"		3	18	6,6,6
19'-4 1/4"		22'-4 1/4"		4	18	3,6,6,3
19'-4 1/4"		22'-4 1/4"		4	18	4,5,5,4
19'-7 1/8"		22'-7 1/8"		5	18	3,4,4,4,3
20'-7 1/2"		23'-9 1/2"		5	19	3,5,3,5,3
21'-5"		24'-9"		4	20	5,5,5,5
21'-5"		24'-9"		4	20	4,6,6,4
21'-7 7/8"		24'-11 7/8"		5	20	4,4,4,4,4
21'-10 3/4"		25'-2 3/4"		6	20	3,3,4,4,3,3

* TWO LIGHT WIDE UNITS ARE FURNISHED IN THREE LIGHT HEIGHTS ONLY





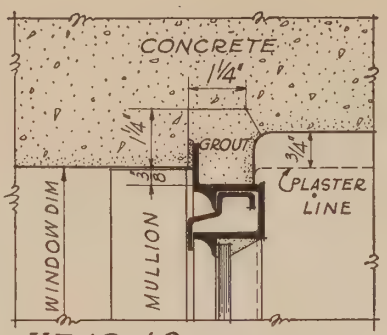
SCALE: HALF FULL SIZE



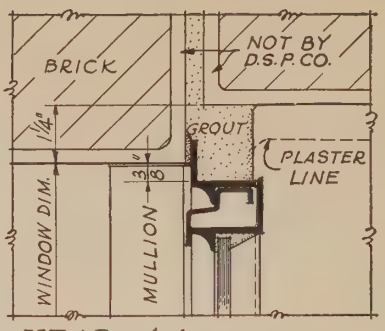
TYPICAL COMBINATION

SCALE: 3" = 1'-0"

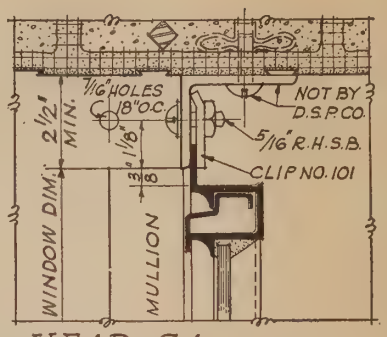
NOTE:- IN FIGURING OPENING SIZES FOR COMBINED UNITS, ADD TOGETHER THE WINDOW DIMENSIONS PLUS 2" FOR EACH VERTICAL MULLION. STANDARD COMBINATIONS ARE GIVEN IN THE TABLE. WHEN USING TABLE ALWAYS COMBINE 18" HEIGHTS WITH 12" WIDTHS AND 20" HEIGHTS WITH 14" WIDTHS.



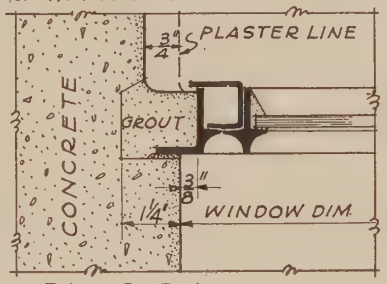
"HEAD-1-B" REBATE IN THE SOFFIT PERMITS INSTALLATION OF WINDOWS AFTER WALL IS BUILT.



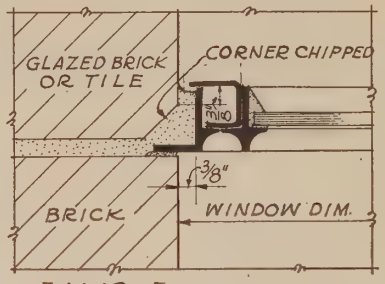
"HEAD-4-A" ANGLE SHOULD ALWAYS BE OFFSET AS SHOWN



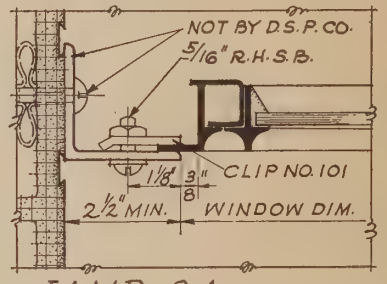
"HEAD" 7-A "STEEL ANGLE FRAME IN TILE OPENINGS.



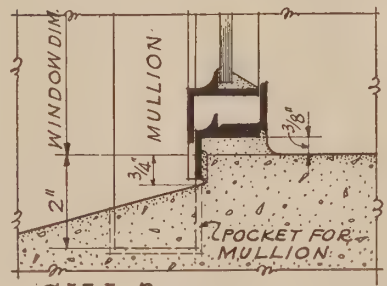
"JAMB-2-A" FOR SINGLE OR MULTIPLE UNIT OPENINGS



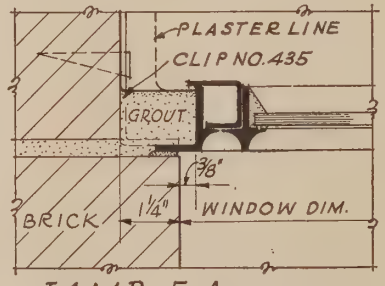
"JAMB-5" FOR MULTIPLE UNIT OPENINGS ONLY.



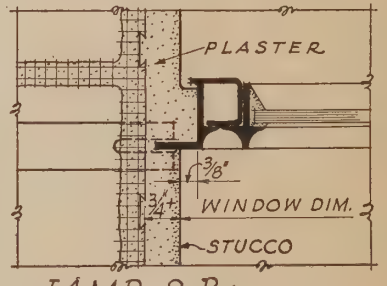
"JAMB-8-A" STEEL ANGLE FRAME IN TILE OPENINGS.



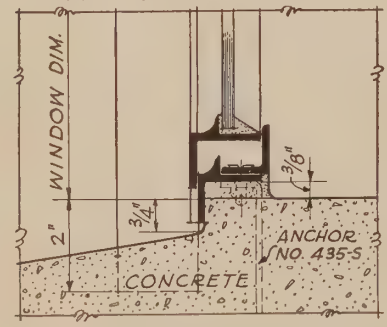
"SILL-3" PRECAST CONCRETE MAY ALSO BE USED FOR BRICK OR TILE CONSTRUCTION



"JAMB-5-A" FOR SINGLE OR MULTIPLE UNIT OPENINGS.

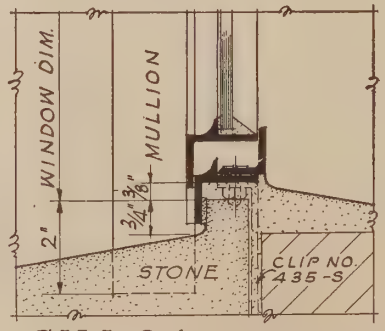


"JAMB-8-B" WITH SPLIT CLIP FURNISHED BY D.S.P.CO.



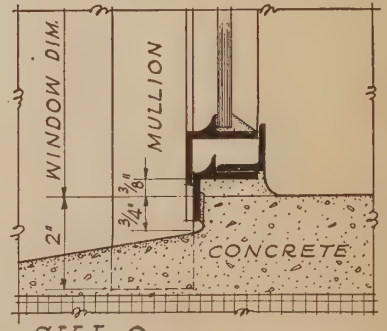
"SILL-3-A" POURED CONCRETE ANCHOR CLIP FURNISHED BY D.S.P.CO.

"CONCRETE"



"SILL-6-A" CUT STONE. AS ALTERNATES USE DETAILS 3 OR 3-A.

"BRICK"



"SILL-9" CONCRETE SILL, POURED AFTER WINDOW IS SET

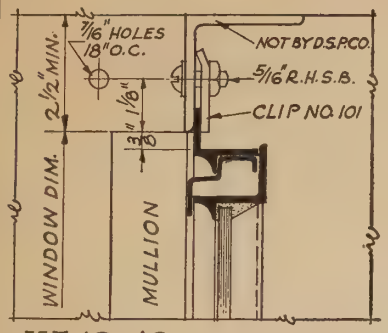
"TILE"

"SCALE: 3" = 1'-0"

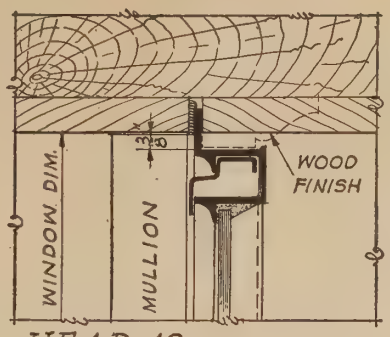
Fenestra *August 1927*

Horizontally Pivoted Windows
Installation Details

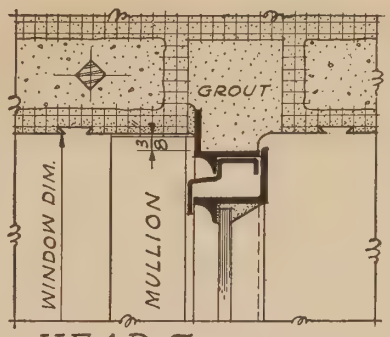
Plate No *L-104*



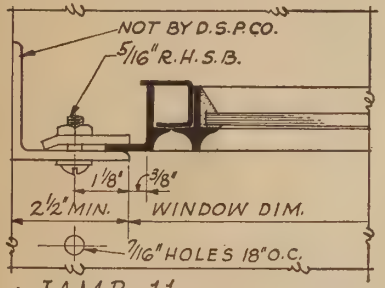
"HEAD-10" STEEL ANGLE.
CLIP & BOLT FURNISHED BY D.S.P.CO.



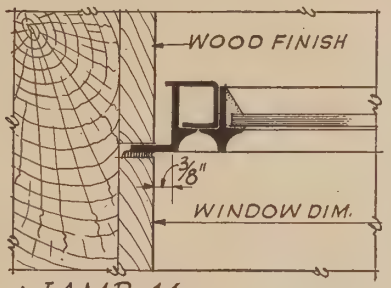
"HEAD-13" DOTTED LINES SHOW ALTERNATE FINISH."



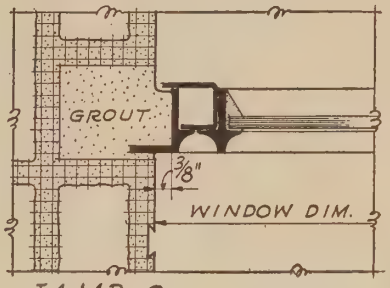
"HEAD-7" FOR TILE LINTEL WITH STEEL WINDOW RAGGLE AS SHOWN



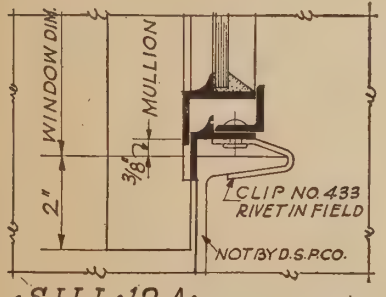
"JAMB-11" STEEL ANGLE
CLIP & BOLT FURNISHED BY D.S.P.CO.



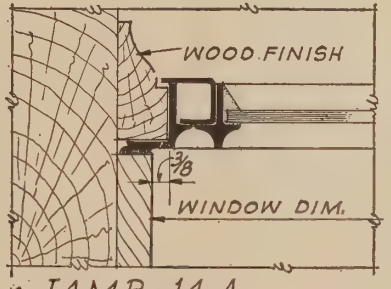
"JAMB-14" PLAIN TRIM.



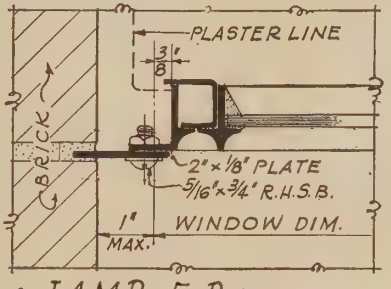
"JAMB-8" FOR TILE WITH STEEL WINDOW RAGGLE AS SHOWN.



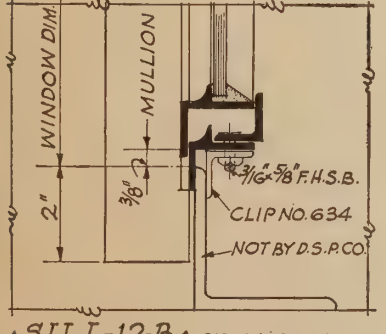
"SILL-12-A" STEEL CHANNEL
CLIP & RIVET FURNISHED BY D.S.P.CO.



"JAMB-14-A" MOLDING FINISH ALTERNATE FOR JAMB-14

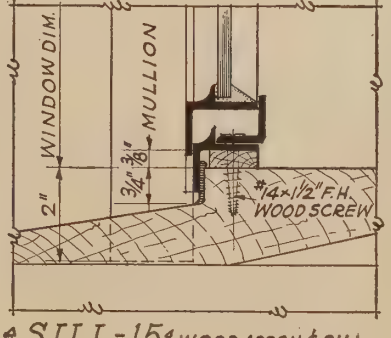


"JAMB-5-B" DETAIL USING JAMB PLATE"



"SILL-12-B" STEEL ANGLE.
CLIP & BOLT FURNISHED BY D.S.P.CO.

"STEEL"



"SILL-15" WOOD APRON & SILL.

"WOOD"

"SCALE: 3" = 1'-0""

"MISCELLANEOUS"

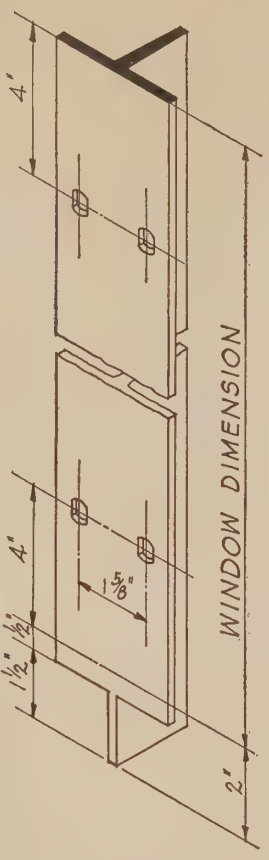
THE MULLIONS SHOWN WITH THESE DETAILS HAVE THE STEM TURNED OUT. IT IS ADVISABLE TO DO THIS AS GREATER STIFFNESS IS SECURED.

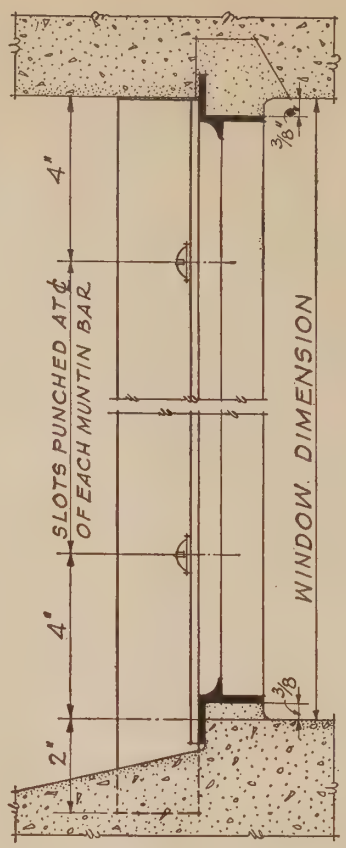
WITH STEEL WORK THIS IS ESSENTIAL IN ORDER TO AVOID NOTCHING OF THE STEEL OR A SPECIAL CUT-OFF OF MULLIONS.

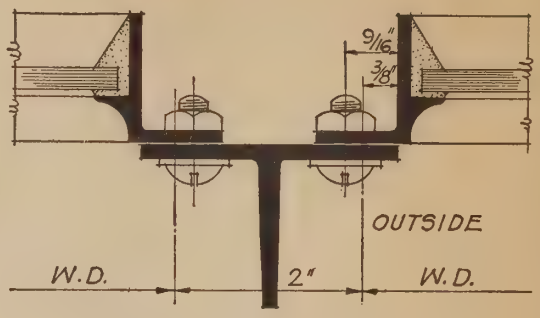
ANCHORING MULLIONS AT SILL AS SHOWN IS RECOMMENDED.

"SCALE: 3" = 1'-0""

Fenestra, August 1927	Horizontally Pivoted Windows Installation Details	Plate No. L-105

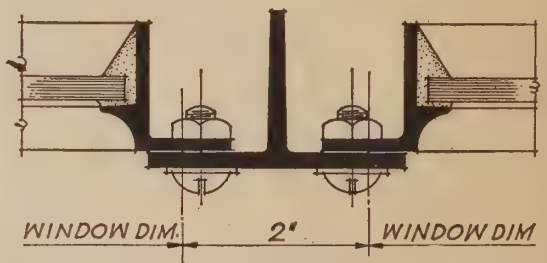






"STEM" TURNED "OUT"

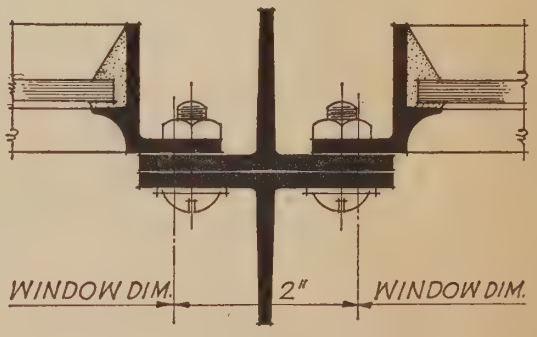
RECOMMENDED DETAIL. THE OUTSTANDING LEG PROVIDES ADDITIONAL RIGIDITY. CAN BE USED FOR SASH UP TO 7 LIGHTS HIGH, 20" GLASS. MULLIONS MAY BE USED WITH STEM TURNED IN AS SHOWN BELOW IF DESIRED.



"STEM" TURNED "IN"

"SKETCH" "VERTICAL" SECTION"

"VERTICAL" MULLION "DETAILS"

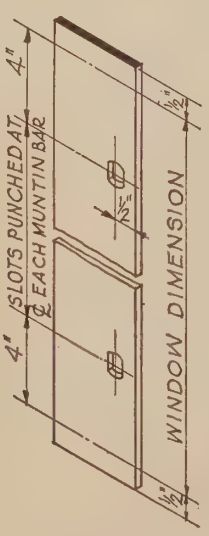


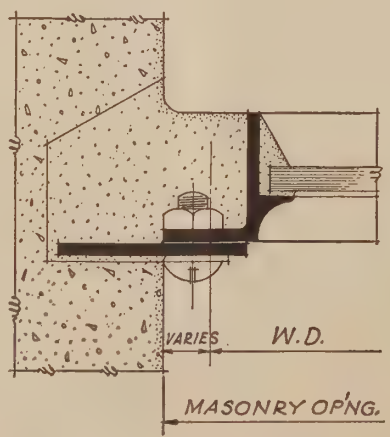
"DOUBLE" MULLION"

SHOULD BE USED ON SASH HIGHER THAN 7 LIGHTS 20" GLASS, OR WHERE EXTRA WIDE OPENINGS ARE TO BE FILLED AND WHERE THE EXPOSURE IS SEVERE.

NOTE:- PROVISION SHOULD ALWAYS BE MADE FOR ANCHORING MULLIONS IN THE SILL. SEE VERTICAL SECTION ABOVE.

BOLT HOLES ARE PUNCHED TO MATCH THE JAMB BARS OF SASH, 4" FROM WINDOW DIMENSION POINT AT TOP AND BOTTOM AND OPPOSITE EACH MUNTIN BAR.



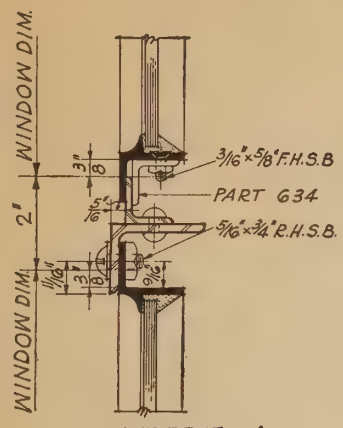


"HORIZONTAL" SECTION"

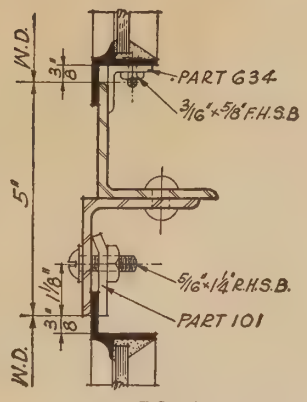
"JAMB" PLATE "DETAILS"

"SCALE: HALF "FULL" SIZE"

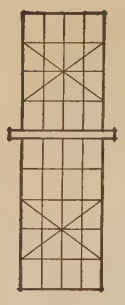
Fenestra, August 1927	Horizontally Pivoted Windows Vertical Mullion Details	Plate No. L-106



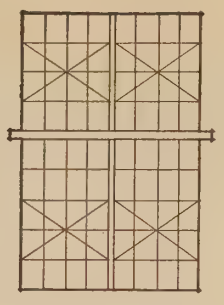
•TYPE-1•



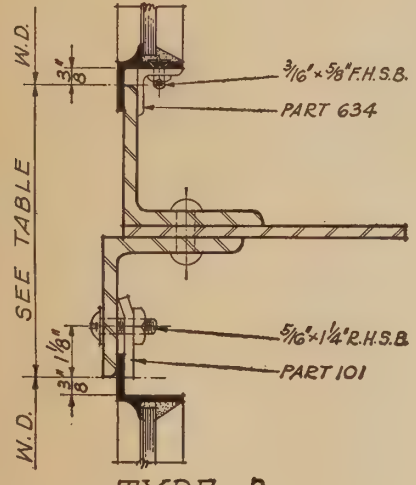
•TYPE-2•



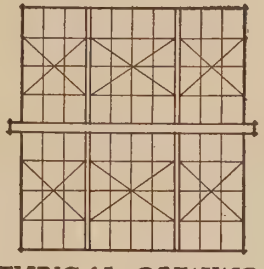
•TYPICAL OPENING• •TYPE NO. 1•



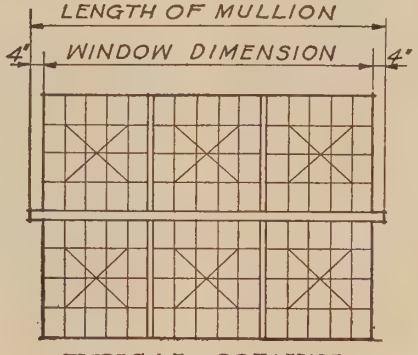
•TYPICAL•OPENING• •TYPE•NO. 2•



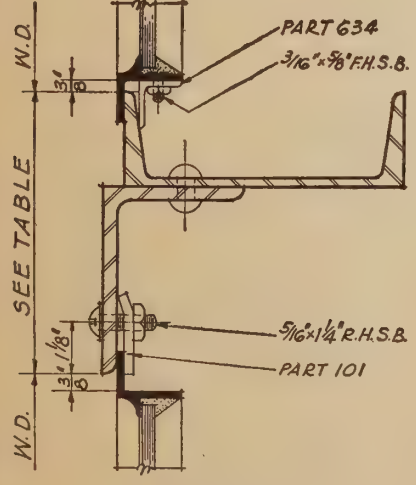
•TYPE-3•



•TYPICAL•OPENING• •TYPES•NO.-3&4•



•TYPICAL•OPENING• TYPES•NO.3&4•



•TYPE-4•

•DETAILS•SCALE: 3"-1'-0"•

•TABLE•OF•HORIZONTAL• •MULLION•SIZES•

LIGHTS WIDE	MULL. TYPE NO.	•ANGLES• REQ'D.	•ANGLES• •SIZE•	PLATE OR CHANNEL	ESTIMATED WEIGHT OF MULL PER FT.	BETWEEN WINDOW DIMENS.
SINGLE UNIT OPENINGS	1	1	1"×1"×1/8"	NONE	3.0 LBS.	2"
		1	2"×1 1/2"×3/16"			
•12"×18" SIZE GLASS•						
3 TO 9	2	2	2 1/2"×2 1/2"×3/16"	NONE	6.5 LBS.	5"
10 TO 13	3	2	2 1/2"×2 1/2"×3/16"	6"×1/4" PLT.	11.5 LBS.	5 1/4"
10 TO 13	4	1	3 1/2"×2 1/2"×1/4"	4" CHANNEL	10.5 LBS.	5 1/4"
14 TO 18	3	2	3"×3"×5/16"	6"×1/4" PLT.	17.5 LBS.	6 1/8"
14 TO 18	4	1	4"×3"×5/16"	6" CHANNEL	15.5 LBS.	6 1/8"
•14"×20" SIZE GLASS•						
3 TO 8	2	2	2 1/2"×2 1/2"×3/16"	NONE	6.5 LBS.	5"
9 TO 11	3	2	2 1/2"×2 1/2"×3/16"	6"×1/4" PLT.	11.5 LBS.	5 1/4"
9 TO 11	4	1	3 1/2"×2 1/2"×1/4"	4" CHANNEL	10.5 LBS.	5 1/4"
12 TO 16	3	2	3"×3"×5/16"	6"×1/4" PLT.	17.5 LBS.	6 1/8"
12 TO 16	4	1	4"×3"×5/16"	6" CHANNEL	15.5 LBS.	6 1/8"

Fenestra *August 1927*

Horizontally Pivoted Windows
Horizontal Mullion Details

Plate No *L-107*

HORIZONTALLY PIVOTED WINDOW FITTINGS AND HARDWARE

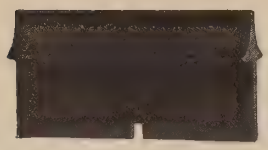


Fig. 1

Fig. 2

Fig. 3

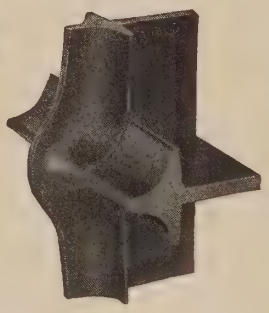


Fig. 4

Fig. 7

Figs. 1, 2, 3 and 4 show four views of the patented Fenestra joint by means of which vertical and horizontal bars are interlocked with increased strength at the point of intersection. Fig. 1 shows the horizontal bar with nick cut out. Fig. 2 shows the vertical bar with slot. Fig. 3 shows vertical bar expanded to receive horizontal bar. Fig. 4 shows the completed Fenestra joint.

Fig. 5 shows the Fenestra butt. Fig. 6 shows the weathering member at ventilator sill, mitered to guide water out of the building. Fig. 7 shows the cam handle, stay bar and riveted Z-bar bracket. Fig. 8 shows the spring latch, chain and pulley at the head of ventilator. Fig. 9 shows the cam handle at the sill with endless chain passing over pulley at the head. Fig. 10 shows the spring latch at the sill with chain passing over pulley at head; also chain cleats attached either to the muntins or the building construction.

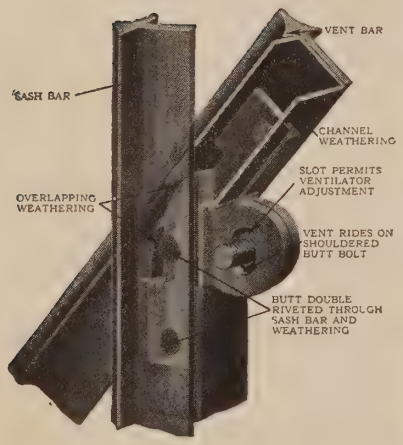


Fig. 5

Fig. 8

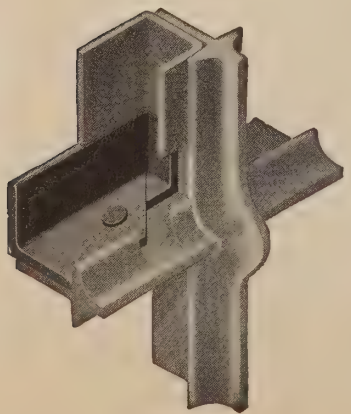


Fig. 6

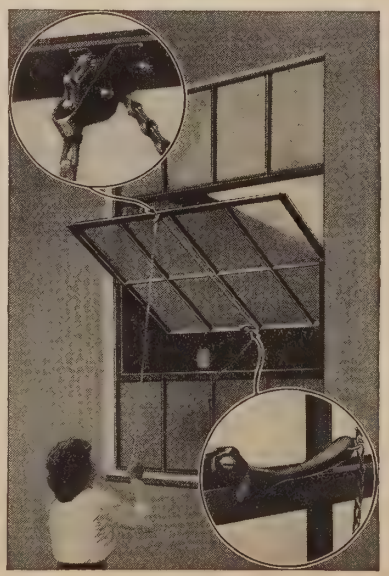


Fig. 9

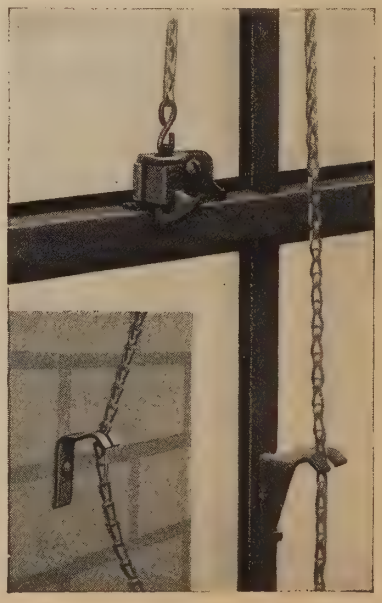
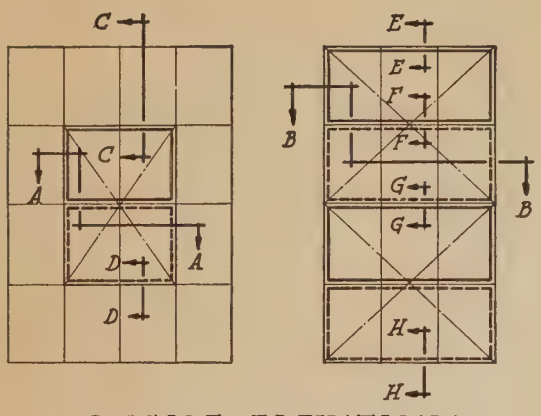


Fig. 10



OUTSIDE ELEVATIONS

NOTE

STANDARD SCREENS ARE MADE FOR 4, 6 OR 8 PANE VENTILATORS IN BOTH 12"×18" AND 14"×20" GLASS.

SCREEN FRAMES ARE OF ELECTRICALLY WELDED CONSTRUCTION FROM OPEN HEARTH STEEL GALVANIZED AND FINISHED IN BLACK BAKED ENAMEL. TURN BUTTONS, HINGE LUGS AND WING NUTS ARE BRASS. BOLTS ARE STEEL GALVANIZED AND CLAMPS ARE OF STEEL GALVANIZED WITH TIPS OF MONEL METAL (A NON-RUSTING AND NON-CORRODING MATERIAL).

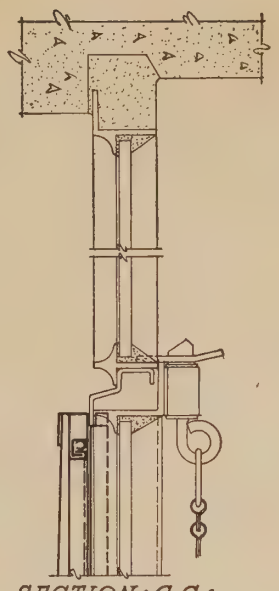
CLOTH IS OF 16 MESH OXIDIZED BRONZE WIRE AND IS WOVEN FROM #32 GAUGE BRONZE WIRE.

SCREENS ARE MADE TO ALLOW 45° OPENING AND LIMIT RING MUST BE PLACED IN CHAIN TO REGULATE THIS.

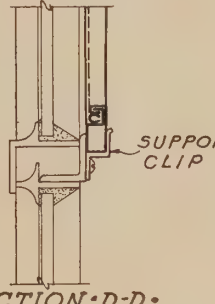
WHEN VENTILATOR COMES TO THE HEAD OF AN OPENING OR DIRECTLY BELOW ANOTHER VENTILATOR, A LOWER OUTSIDE SCREEN AND FILLER PIECE IS USED. SEE DETAILS E-E AND G-G.

WHEN SCREENING IS SPECIFIED THE WINDOWS ARE PUNCHED IN SHOP TO RECEIVE NECESSARY CLIPS FOR HOLDING SCREENS, WHILE SCREENS AND CLIPS ARE SHIPPED DIRECT FROM MANUFACTURER.

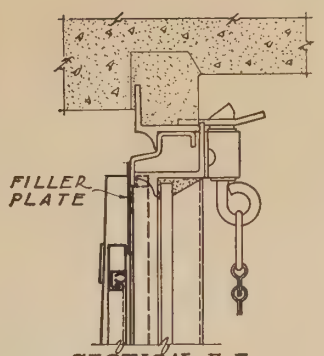
IF SCREENING IS NOT SPECIFIED BUT LATER IS DESIRED IT WILL BE NECESSARY TO DRILL HOLES FOR ATTACHING CLIPS IN FIELD.



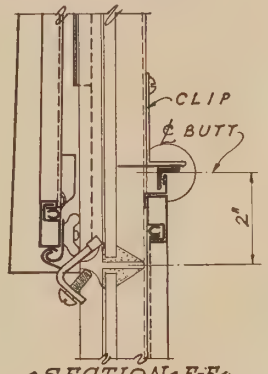
SECTION C-C
WITH FIXED PANE ABOVE VENTILATOR



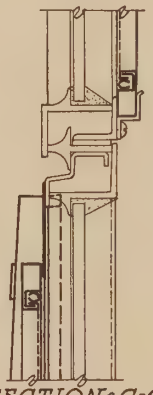
SECTION D-D



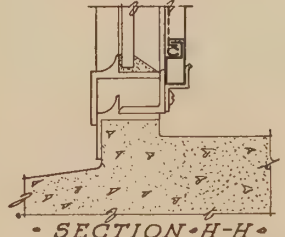
SECTION E-E
WHEN VENT COMES TO HEAD OF WINDOW



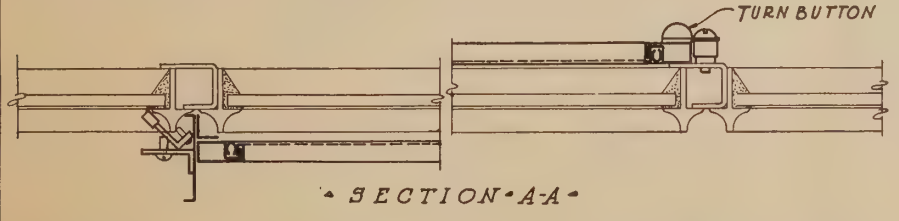
SECTION F-F



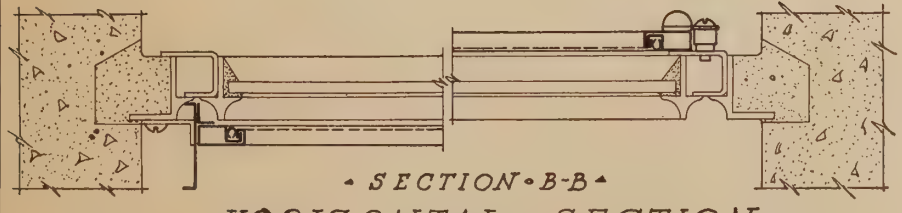
SECTION G-G
VENT ABOVE VENT



SECTION H-H



SECTION A-A



SECTION B-B

HORIZONTAL SECTION

SCALE: 3" = 1'-0"

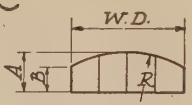
VERTICAL SECTION

Fenestra August 1927	Horizontally Pivoted Windows Screening Details	Plate No L-108

CAMBER HEAD UNITS ONE PANE HIGH

C-31

12"×18"	14"×20"
3'-2" - W.D. -	3'-8"
1'-6 1/8" - A -	1'-8 1/8"
1'-1" - B -	1'-2 1/4"
3'-2" - R -	3'-8"

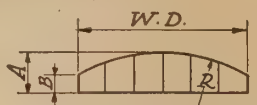


C-41

12"×18"	14"×20"
4'-2 3/8" - W.D. -	4'-10 3/8"
1'-6 1/8" - A -	1'-8 1/8"
-11 3/8" - B -	1'-0 5/16"
4'-2 3/8" - R -	4'-10 3/8"

C-51

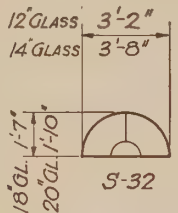
12"×18"	14"×20"
5'-2 3/4" - W.D. -	6'-0 3/4"
1'-6 1/8" - A -	1'-8 1/8"
-9 1/16" - B -	-10 3/8"
5'-2 3/4" - R -	6'-0 3/4"



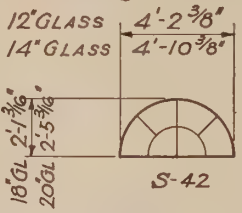
C-61

12"×18"	14"×20"
6'-3 1/8" - W.D. -	7'-3 1/8"
1'-6 1/8" - A -	1'-8 1/8"
-8 1/16" - B -	-8 7/16"
6'-3 1/8" - R -	7'-3 1/8"

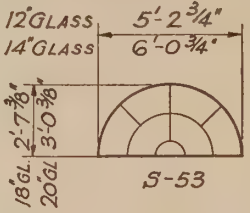
SEMICIRCULAR UNITS NOT OVER SIX PANES WIDE



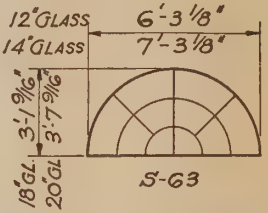
S-32



S-42



S-53



S-63

• ALL ABOVE CAMBER HEAD AND SEMICIRCULAR UNITS HAVE NO. 70 SECTION AT SILL FOR ATTACHMENT TO TOP OF SINGLE SQUARE HEAD SASH, OR FOR INDIVIDUAL INSTALLATION. SEE FIG.-1 BELOW.

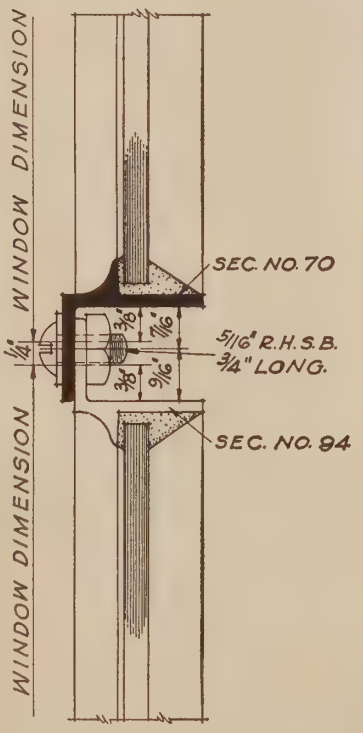


FIG.-1

SECTION THRU UNIT UP TO AND INCLUDING SIX PANES IN WIDTH.

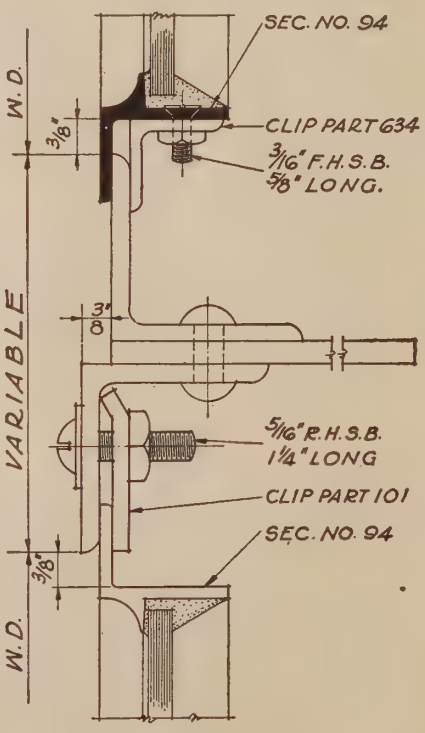
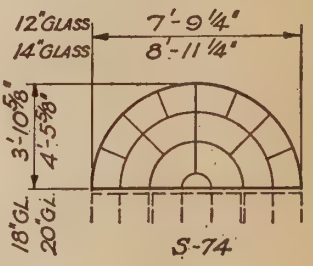


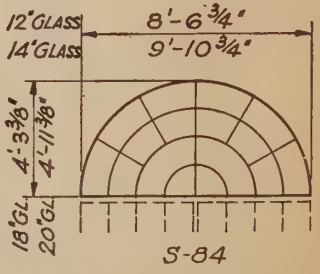
FIG.-2

SECTION THRU UNIT OVER SIX PANES IN WIDTH. FOR SIZE OF STRUCTURAL MULLION SEE PLATE L-107

SEMICIRCULAR UNITS MORE THAN SIX PANES WIDE



S-74

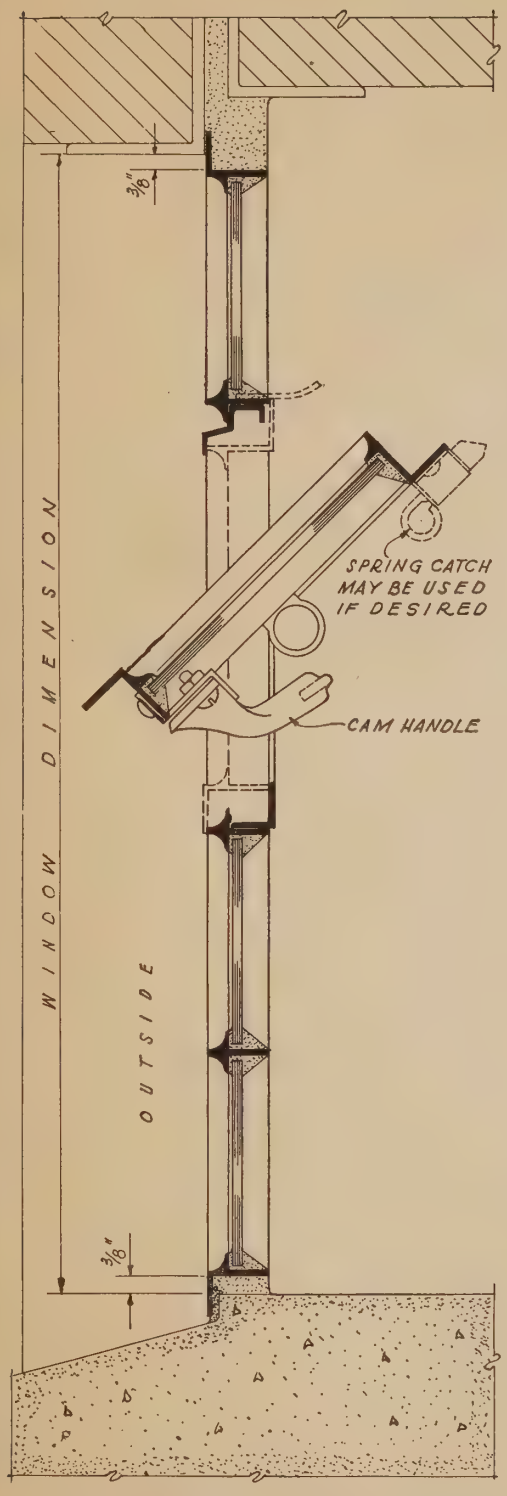


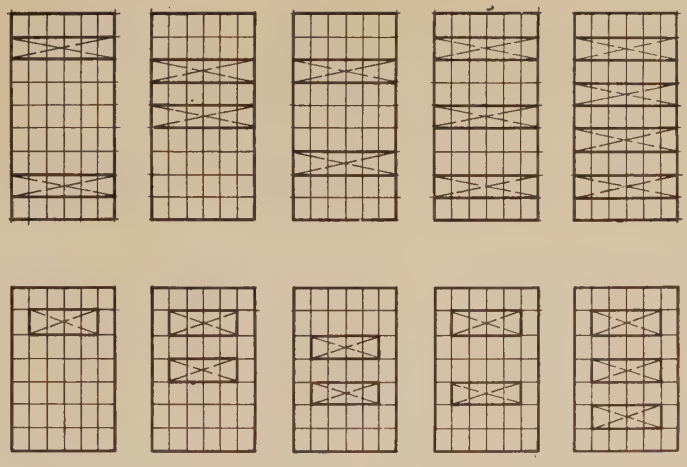
S-84

SEMICIRCULAR UNITS MORE THAN SIX PANES WIDE HAVE NO. 94 SECTION AT SILL FOR ATTACHMENT TO MULTIPLE UNIT OPENING WITH STRUCTURAL HORIZONTAL MULLION, OR FOR INDIVIDUAL INSTALLATION. SEE FIG. 2

• DETAILS • SCALE: HALF • FULL • SIZE •

Fenestra, August 1927	Horizontally Pivoted Windows Camber and Semi-Circular Heads	Plate No. L-109





SUGGESTED VENTILATOR ARRANGEMENTS

VENTILATORS MUST HAVE FIXED PANE BETWEEN

NOTES

DESIGNED TO ACT AS A COMBINATION STEEL WINDOW AND STEEL GRATING IN PRISONS, HOSPITALS, PENITENTIARIES AND REFORM SCHOOLS.

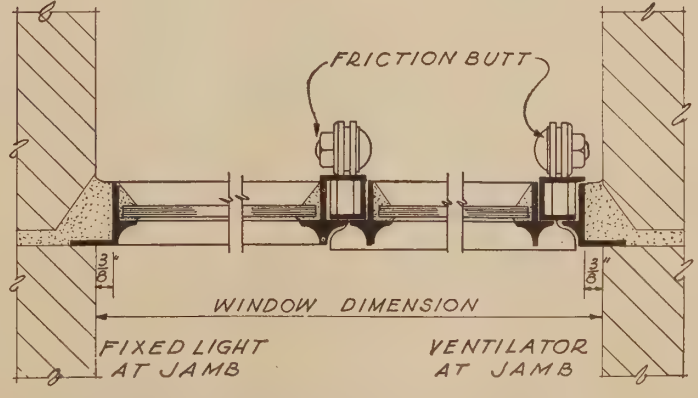
GLASS LIGHTS USUALLY 7"x9" WITH ONE PANE HIGH VENTILATOR PIVOTED 4" FROM TOP.

VENTILATORS MAY OPERATE INDIVIDUALLY OR IN MULTIPLE RUNS CONTROLLED MECHANICALLY FROM ONE OR MORE CENTRALLY LOCATED STATIONS.

FIXED LIGHT WINDOWS OF THIS TYPE FREQUENTLY USED UNGLAZED AS GRATINGS OUTSIDE MOVABLE WOOD WINDOWS.

NO STANDARDIZED TYPES OR SIZES. SUGGESTED VENTILATOR ARRANGEMENTS SHOWN ABOVE.

TABLE OF SIZES	
WIDTHS	
4 PANES	2'-6 3/8"
5 PANES	3'-1 3/4"
6 PANES	3'-9 1/8"
7 PANES	4'-4 1/2"
8 PANES	4'-11 7/8"
HEIGHTS	
4 PANES	3'-2 3/8"
5 PANES	3'-11 3/4"
6 PANES	4'-9 1/8"
7 PANES	5'-6 1/2"
8 PANES	6'-3 7/8"
9 PANES	7'-1 1/4"



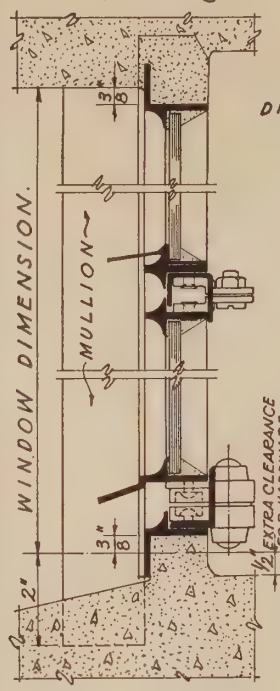
VERTICAL SECTION

HORIZONTAL SECTION

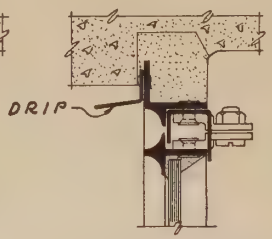
SCALE: 3"-1'-0"

Fenestra, August 1927	Steel Detention Windows Types and Cross Sections	Plate No. L-201

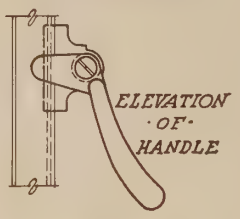
VERTICALLY PIVOTED WINDOWS



VERTICAL SECTION



DETAIL WHEN VENT COMES TO HEAD OF WINDOW



NOTE:- VERTICALLY PIVOTED WINDOWS ARE MADE ONLY IN THE TYPES SHOWN IN ELEVATION.

RIGHT HAND SIDE OF WINDOW, VIEWED FROM OUTSIDE WILL SWING OUT IN ALL CASES.

A SINGLE LOCKING HANDLE WILL BE USED FOR ALL VENTILATORS AND WILL BE LOCATED 4" ABOVE CENTER FOR TWO PANE HIGH AND ON CENTERLINE ON ALL THREE PANE HIGH TYPES.

THESE WINDOWS MAY ALSO BE USED IN STEEL CONSTRUCTION. FOR DETAILS SEE INSTALLATION DETAILS FOR STEEL ON PLATE L-105

2 PANES HIGH
18"GL=3'-1 5/8"
20"GL=3'-5 5/8"
2214

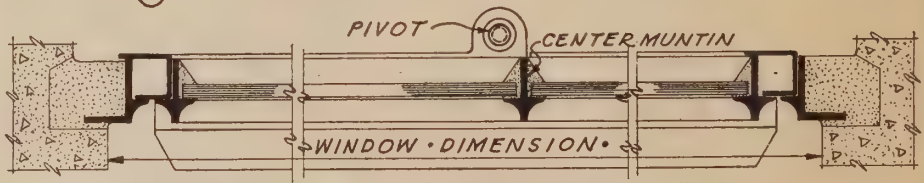
3 PANES HIGH
18"GL=4'-8"
20"GL=5'-2"
2316

4 PANES HIGH
18"GL=6'-2 3/8"
20"GL=6'-10 3/8"
2416

5 PANES HIGH
18"GL=7'-8 3/4"
20"GL=8'-6 3/4"
2516

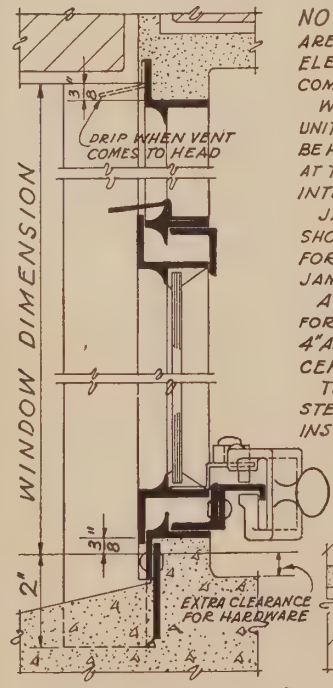
2 PANES WIDE
12" GLASS = 2'-1 5/8"
14" GLASS = 2'-5 5/8"

STANDARD TYPES



HORIZONTAL SECTION

SIDE HINGED WINDOWS



VERTICAL SECTION

NOTE:- SIDE HINGED OPEN OUT WINDOWS ARE MADE ONLY IN THE TYPES SHOWN IN ELEVATION. ALL HAVE THE VENTILATORS COMING TO THE JAMB OF THE WINDOW.

WHEN MULLIONS ARE USED BETWEEN TWO UNITS, IT IS NECESSARY THAT THE VENTILATORS BE HINGED AT THE MASONRY JAMB AND NOT AT THE MULLION JAMB DUE TO THE HINGE INTERFERING WITH MULLION.

JAMB PLATES ARE RECOMMENDED AND SHOULD BE USED AT BOTH JAMBS AND SILL FOR SINGLE OPENINGS AND ON MASONRY JAMBS AND SILL FOR DOUBLE OPENINGS.

A SINGLE LOCKING HANDLE WILL BE USED FOR ALL VENTILATORS AND WILL BE LOCATED 4" ABOVE CENTER FOR TWO PANE HIGH AND ON CENTERLINE FOR THREE PANE HIGH TYPES.

THESE WINDOWS MAY ALSO BE USED IN STEEL CONSTRUCTION. FOR DETAILS SEE INSTALLATION DETAILS ON PLATE NO. L-105

2 PANES HIGH
18"GL=3'-1 5/8"
20"GL=3'-5 5/8"
2214-L 2214-R

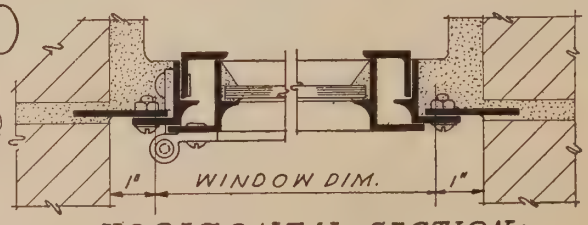
3 PANES HIGH
18"GL=4'-8"
20"GL=5'-2"
2316-L 2316-R

4 PANES HIGH
18"GL=6'-2 3/8"
20"GL=6'-10 3/8"
2416-L 2416-R

5 PANES HIGH
18"GL=7'-8 3/4"
20"GL=8'-6 3/4"
2516-L 2516-R

2 PANES WIDE
12" GLASS = 2'-1 5/8"
14" GLASS = 2'-5 5/8"

STANDARD TYPES

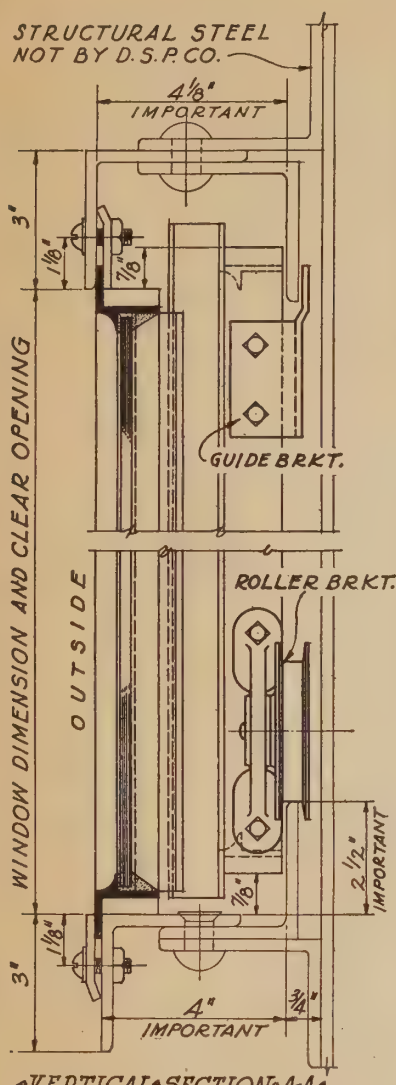


HORIZONTAL SECTION

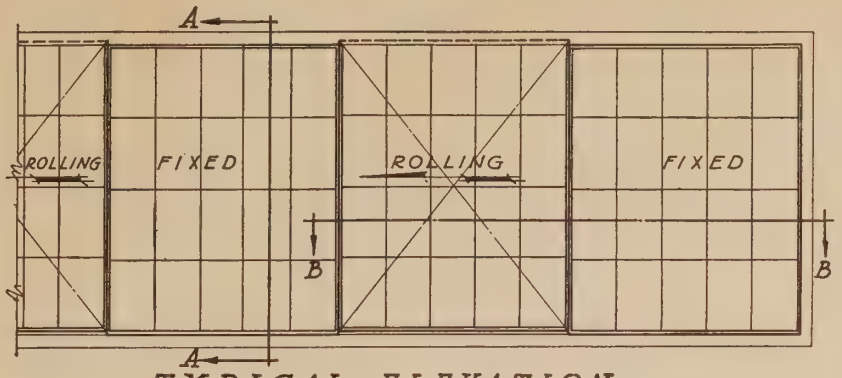
SCALE: 3"=1'-0"

MULLION

Fenestra, August 1927	Vertically Pivoted Windows Side Hinged Windows	Plate No. L-301

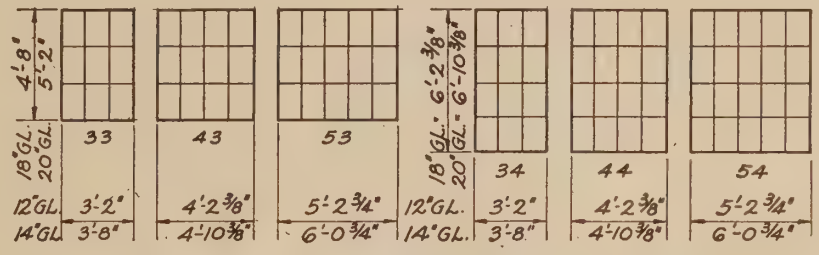


VERTICAL SECTION A-A



TYPICAL ELEVATION

STANDARD TYPES



NOTE

HORIZONTALLY ROLLING WINDOWS ARE FURNISHED ONLY IN THE TYPES AND SIZES SHOWN ABOVE.

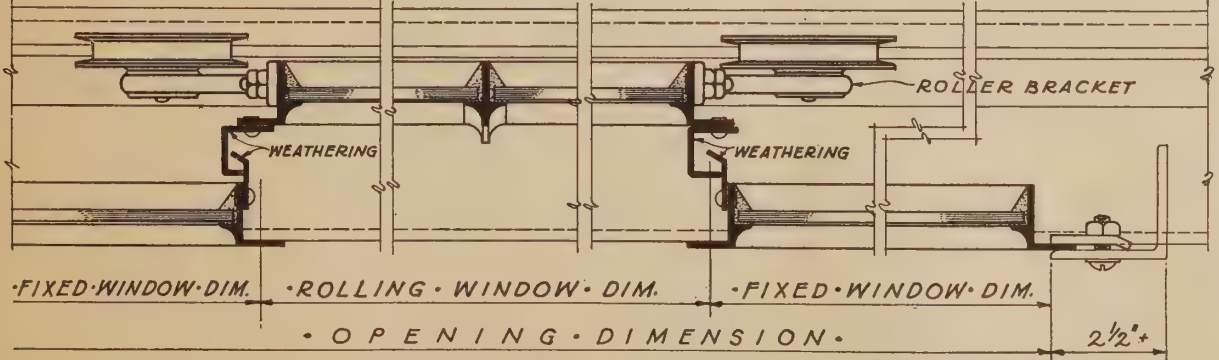
WE DO NOT RECOMMEND THIS CONSTRUCTION WHERE WEATHERTIGHTNESS IS REQUIRED.

THE GUIDE BRACKETS ARE ATTACHED IN SHOP AND THE ROLLER BRACKETS SHIPPED LOOSE TO BE ATTACHED AT ERECTION.

TO DETERMINE THE TOTAL OPENING DIMENSION MULTIPLY THE WINDOW DIMENSION BY THE NUMBER OF UNITS USED.

THE STRUCTURAL STEEL FRAMING AND TRACK, FURNISHED BY OTHERS, MUST BE OF SUFFICIENT STRENGTH OR BRACED SECURELY BETWEEN SPANS TO SUPPORT WINDOWS AND PREVENT SAGGING.

THE DIMENSIONS MARKED "IMPORTANT" MUST BE FOLLOWED CLOSELY FOR THIS TYPE OF WINDOW.



HORIZONTAL SECTION B-B

SCALE: 3" - 1'-0"

Fenestra, August 1927	Horizontally Rolling Windows Typical Details	Plate No. L-401

(P) CONTINUOUS TOP HUNG WINDOWS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications.

Note: Structural Steel Truss spacing, best adapted to the use of standard Continuous Window units, is in multiples of 4′ (16′, 20′, 24′) to accommodate standard 4′ centering for girt butt attachment.

Note: Intermediate structural vertical members should be provided approximately 8′ to 12′ apart.

Note: Structural Steel Girts, at heads and sills of Continuous Windows, are not furnished by the Window Manufacturer, and are so noted on the window details. These girts should be provided for in the Structural Steel Specifications including punching for attachment of window butts in accordance with standard Fenestra punching details. (See Fenestra, Page 51.)

Note: Sheet metal flashing at heads, sills, and ends of runs at building construction, is not furnished by the Window Manufacturer, and is so noted on the window details. This flashing should be provided for in the Roofing and Sheet Metal Specifications.

(P-1) Work Included

Note: List and locate. (See paragraph 13, Fenestra Page 2.)

(P-2) General

Continuous Top Hung Windows shall be *Fenestra* as manufactured by Detroit Steel Products Company.

Note: Fenestra Continuous Windows are particularly designed for use in monitor and sawtooth roof construction where the plane of the windows is on a slope. They may be used in vertical planes where necessary. The chief advantage of this type of window lies in the fact that it provides for an easily and rapidly operated continuous opening from one end of the building to the other.

Note: Standard units of Continuous Windows measure 20′ in length (dimension points equal the clear opening). We recommend, for the economical arrangement of operator arms and to permit girt punching on even 4′ centers for butt attachment, that units vary on multiples of 4′ (8′, 12′, 16′). Smaller units may be used, if necessary, in widths varying in multiples of 2′ (8′, 10′, 12′, 14′, 16′, 18′).

(P-3) Materials

(P-3a) Window Sections—All sections shall be specially designed, hot rolled, solid steel bars with heavy fillets in all re-entrant angles.

(P-3b) Head and End Jamb Members—Head and end jamb members shall be special angles.

(P-3c) Muntins—Muntins shall be special Ts 1⅜″ deep.

(P-3d) Sills—Sills shall be special design sections with a long down-standing leg bent at the end to make close contact with the building construction. Provide weep holes for drainage.

(P-4) Construction

(P-4a) Window Units—All members of the window shall be accurately fitted and rigidly riveted at the joints to form standard panel units. Panels shall be joined, end to end midway between T muntins, by splice plates bolted to head and sill members.

Note: Panels are joined at the time of erection.

Note: Riveted assembly assures a strong, tight joining of members, with sufficient flexibility to withstand unusual strain thus obviating the danger of breaks due to imperfect welds.

(P-4b) Stationary End Sections—At the ends of all swing sections next the building construction there shall be provided stationary 1′ panels.

(P-4c) Stationary Intermediate Sections—Between the ends of swing sections there shall be provided stationary 2′ panels.

(P-4d) Weathering Caps—The joint between ends of swing sections and stationary end sections (and stationary intermediate sections) shall be covered and protected by a specially formed, 14 gauge, steel channel with one leg secured to the end angle of the swing section and designed to overlap the end angle of the stationary section.

(P-4e) Storm Panels—Where so indicated, provide 2′ wide storm panels secured to stationary end (and intermediate) panels with a steel plate and to the sill by sill clips. Panels shall underlap the swing window section and shall be provided at sill with a formed continuous drip board, set over the sill flashing.

(P-5) Attached Hardware

Note: Attached at factory.

Butts—All Continuous Windows shall be top hung on heavy malleable iron butts, with ⅜″ brass pins, spaced 4′ apart on centers. Butts shall be rigidly riveted to the head angle and furnished with bolts for attachment to the building girts.

(P-6) Mechanical Operators

Note: Specifications for mechanical operators are given on Fenestra Pages 55 to 59. In selecting type best adapted to the particular conditions, we advise consultation with our representative.

(P-7) Erection

All Continuous Windows shall be erected by the Fenestra Construction Company, under a separate contract.

Note: See Paragraph 5, Fenestra Page 1.

All windows shall be erected in a thoroughly, workmanlike manner ready for glazing.

(P-8) Painting

All windows shall be given one dip-coat of red mineral paint by the manufacturer before shipment.

Note: The following should be provided for in the Painting Specifications:

One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.

Note: Where desired, the Fenestra Construction Company (see Paragraph 5, Fenestra Page 1) at reasonable added cost will do field painting after erection. If required, so specify here, including specification for paint and its application.

(P-9) Glass and Glazing

Note: The following should be included in the Glazing Specifications:

Note: See Paragraph 10, Fenestra Page 2.

(P-9a) Glass—Glass shall be (¼″ rough wire glass).

(P-9b) Putty—Putty shall be a high grade of steel window putty.

Note: Ordinary wood sash putty must not be used. See paragraph 11, Fenestra Page 2.

(P-9c) Glazing—All continuous windows shall be glazed from the outside. All glass shall be set in a heavy bed of putty and secured at muntins and end angles by angle clips secured with bolts. Face putty at sills, applied in a neat, clean-cut. smooth manner.

Note: Do not paint until putty has thoroughly hardened. (See note Paragraph P-8.)

Continuous Fixed Windows

Note: The specification for Continuous Fixed Windows is the same as that for Continuous Top Hung Windows except that all window units are stationary (no swing sections). Heavy steel angle clips bolted to the window head and the building girts are substituted for the butts. Steel sill clips, furnished with the window and shipped flat, are bolted to the sill of the window and bent around the steel sill girt to rigidly secure the window in position at the bottom.

Continuous Bottom Hung Windows

Note: In general the specification for Continuous Bottom Hung Windows is the same as that for Continuous Top Hung Windows except in the following particulars:

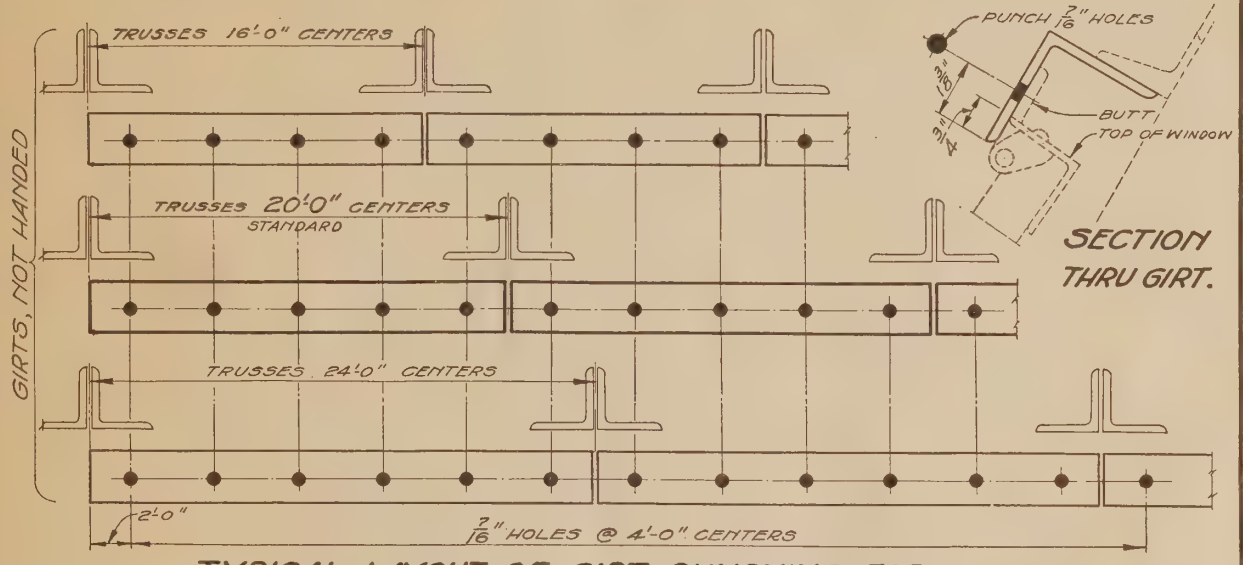
(a) The head section is a special T.

(b) The sill section is a special angle designed to take the butts attached to a special sill girt.

(c) The weathering caps are attached, with the legs out, to the fixed end or intermediate panels instead of to the swing sections.

(d) The windows are glazed on the inside with face putty at both head and sill.

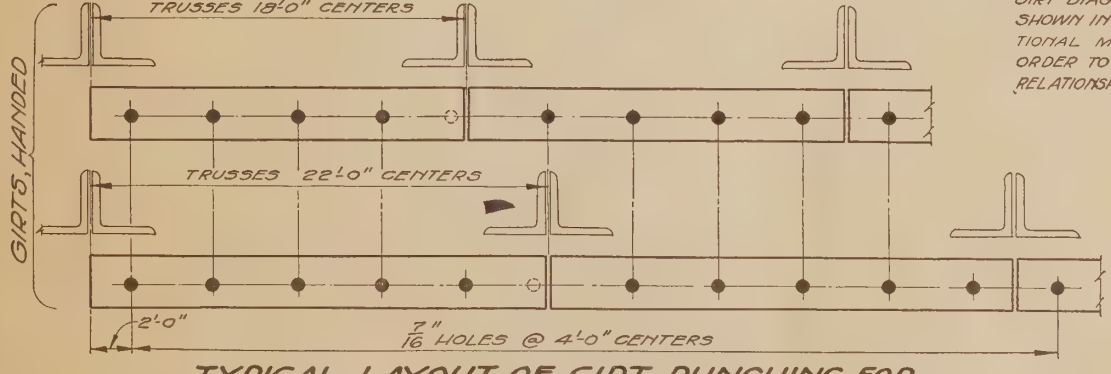
RECOMMENDED TYPICAL LAYOUT OF GIRT PUNCHING FOR STANDARD 20'-0" TRUSS CENTERS.



SECTION THRU GIRT.

TYPICAL LAYOUT OF GIRT PUNCHING FOR TRUSS CENTERS OF 16, 20 AND 24'-0".

NOTE:-TRUSSES ON GIRT DIAGRAM ARE SHOWN IN A CONVENTIONAL MANNER IN ORDER TO SHOW THE RELATIONSHIP TO GIRTS.

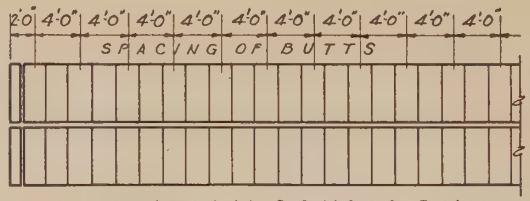


TYPICAL LAYOUT OF GIRT PUNCHING FOR TRUSS CENTERS OF 18 AND 22'-0"

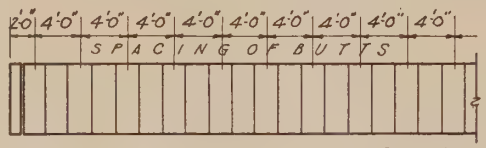
SPACING OF TRUSS CENTERS:-
TRUSS CENTERS OF 17, 19, 21, 23 AND 25 FEET REQUIRE FOUR STYLES OF GIRT PUNCHING (TWO RIGHT AND TWO LEFT) AND SHOULD THEREFORE BE AVOIDED.

GIRT PUNCHING:-
HOLES OCCURING AT JOINT OF GIRTS SHOULD BE OMITTED. SUCH HOLES WILL BE LOCATED AND PUNCHED BY WINDOW ERECTORS

Fenestra, August 1927	Continuous Windows, Top Hung — Girt Punching	Plate No P-101



ELEVATION-DOUBLE RUN



ELEVATION-SINGLE RUN

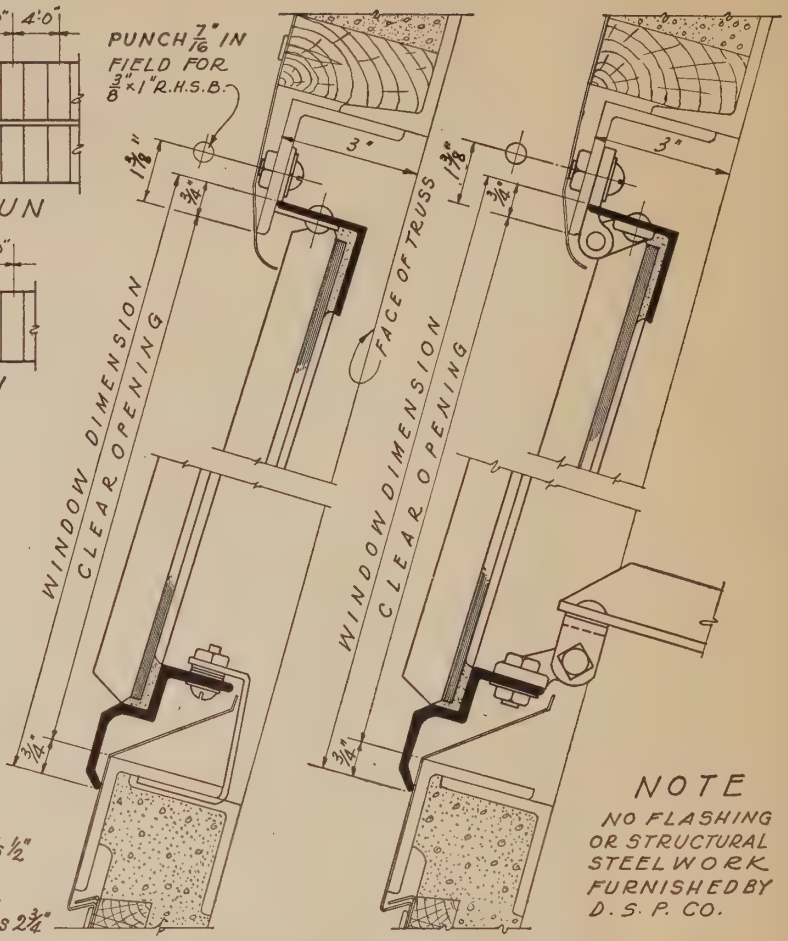
WINDOW HEIGHT	GLASS WIDTH	GLASS HEIGHT
3'-0"	23 1/2"	2'-9 1/4"
4'-0"	23 1/2"	3'-9 1/4"
5'-0"	23 1/2"	4'-9 1/4"
6'-0"	23 1/2"	5'-9 1/4"

TABLE OF WINDOW DIMENSIONS AND CLEAR OPENINGS.	
WINDOW-D.	CLEAR O.
3'-0"	2'-10 1/2"
4'-0"	3'-10 1/2"
5'-0"	4'-10 1/2"
6'-0"	5'-10 1/2"

GLASS SIZES

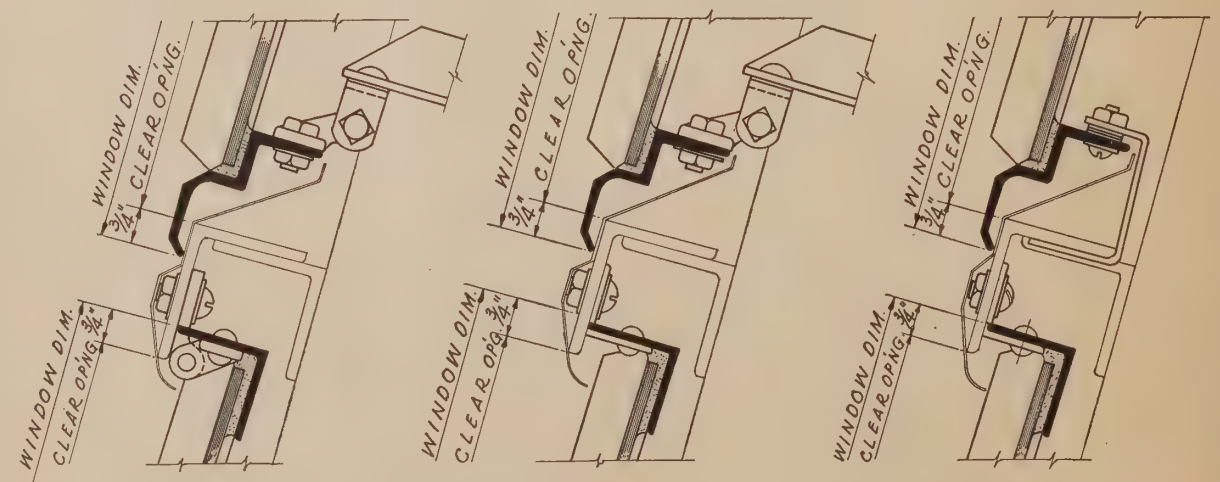
WIDTH EQUALS BAR CENTERS MINUS 1/2"

HEIGHT EQUALS SASH DIMENSION MINUS 2 3/4"



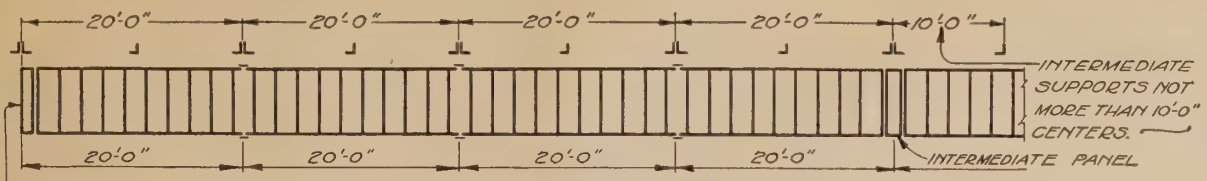
NOTE

NO FLASHING OR STRUCTURAL STEEL WORK FURNISHED BY D.S.P. CO.

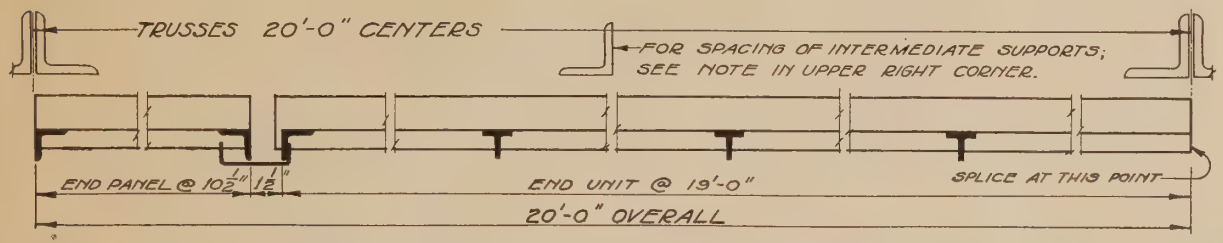


SCALE: 3"-1'-0"

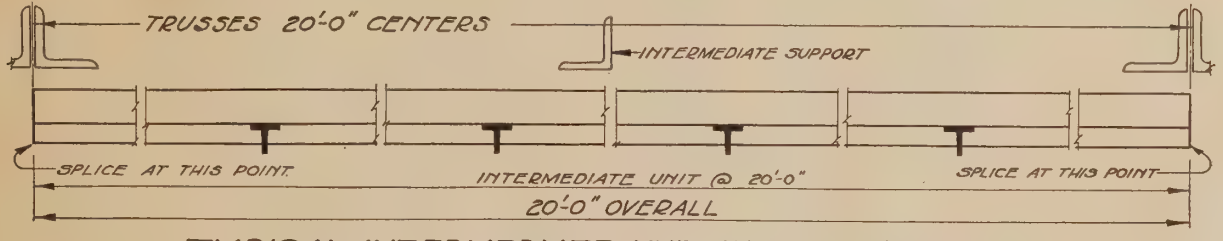
Fenestra, August 1927	Continuous Windows, Top Hung Typical Cross Sections	Plate No P-102



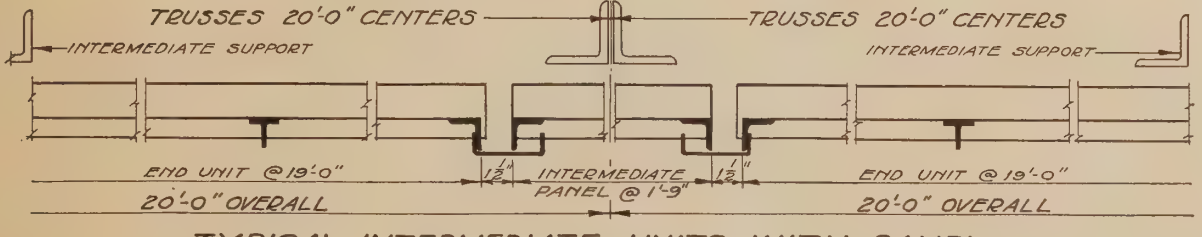
TYPICAL LAYOUT OF STANDARD 20'-0" UNITS


TRUSSES 20'-0" CENTERS
FOR SPACING OF INTERMEDIATE SUPPORTS; SEE NOTE IN UPPER RIGHT CORNER.
END PANEL @ 10 1/2"
1 1/2"
END UNIT @ 19'-0"
SPLICE AT THIS POINT
20'-0" OVERALL

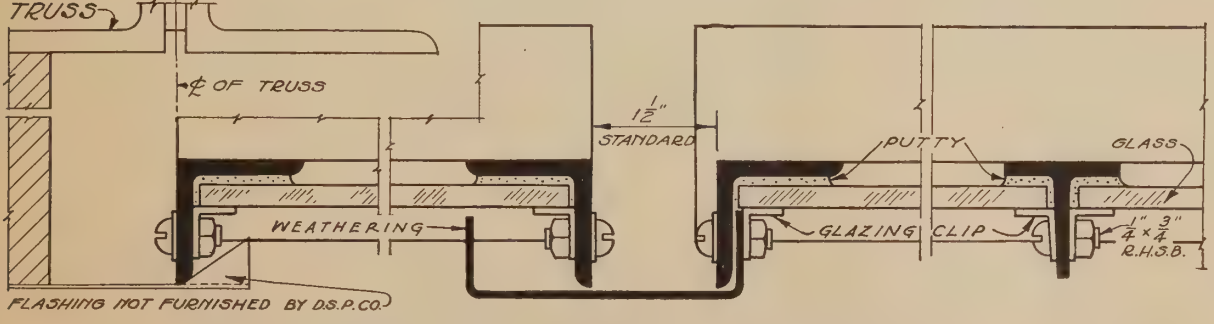
TYPICAL END UNIT WITH PANEL



TYPICAL INTERMEDIATE UNIT WITHOUT PANELS



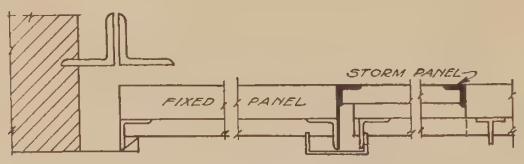
TYPICAL INTERMEDIATE UNITS WITH PANEL



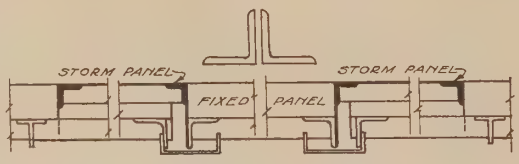
HORIZONTAL SECTION AT END OF RUN

SCALE: HALF FULL SIZE

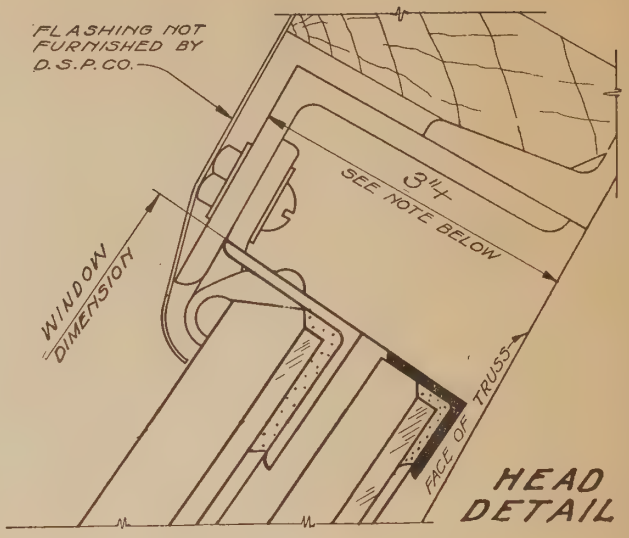
Fenestra, August 1927	Continuous Windows, Top Hung Details of Typical Units	Plate No. P-103



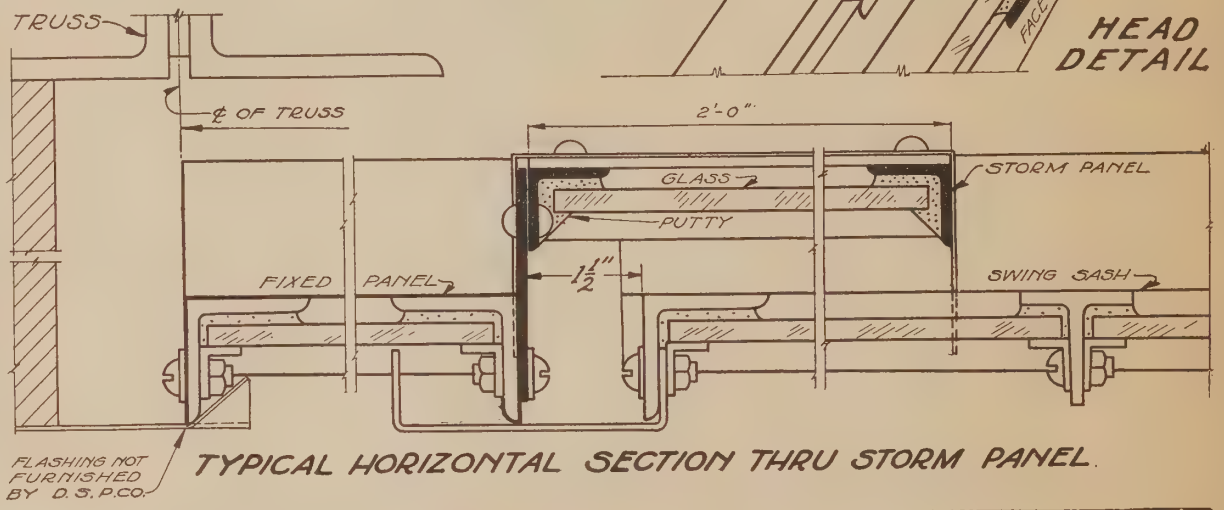
TYPICAL DETAIL AT END OF SWING RUN



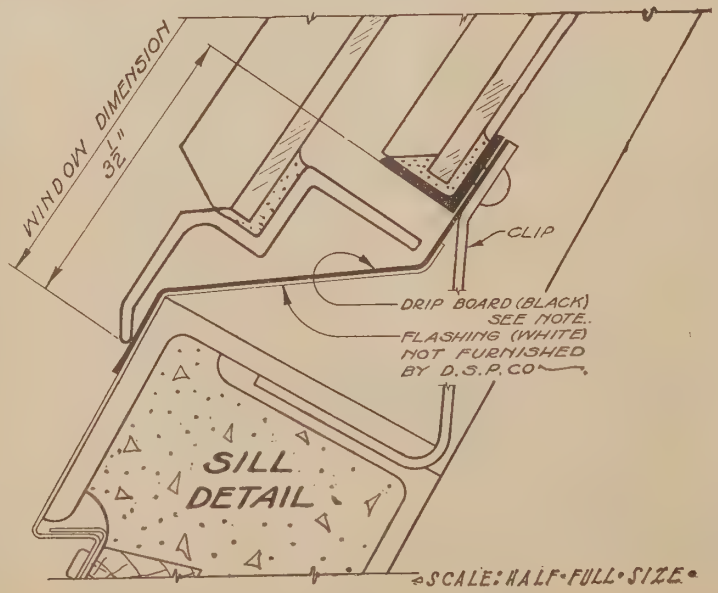
TYPICAL DETAIL BETWEEN SWING RUNS



HEAD DETAIL



TYPICAL HORIZONTAL SECTION THRU STORM PANEL.



NOTE

STORM PANELS CAN BE USED ONLY WITH TOP HUNG WINDOWS. THEY ARE RECOMMENDED ONLY FOR WINDOWS 30° OR LESS OFF THE VERTICAL.

WHEN PANELS ARE USED IN FRONT OF VERTICAL STEEL MEMBERS A GIRT ANGLE OF 3" OR MORE IS REQ'D TO PROVIDE SUFFICIENT SPACE BETWEEN TRUSS AND WINDOW

A DRIP BOARD (SHOWN IN BLACK AT SILL) IS FURNISHED AS PART OF PANEL. THIS DRIP SHOULD NOT BE CONFUSED WITH FLASHING AT SILL WHICH IS NOT FURNISHED BY D.S.P.CO.

THE HEIGHT OF GLASS IN PANEL IS EQUAL TO WINDOW DIMENSION MINUS 4". THE GLASS WIDTH IS 1'-11½".

Fenestra, *August 1927*	*Continuous Windows, Top Hung* *Storm and End Panels*	**Plate No** *P-104*

MECHANICAL OPERATING DEVICES

While the designing of mechanical operators for the various types of Fenestra windows is not in any sense complicated, so many different building conditions are encountered that it is impossible to lay down hard and fast rules, limits and specifications which the architect may use without first consulting a Fenestra representative.

The following specifications and plates therefore should be regarded as explanatory and advisory only.

Fenestra operators are not sold as separate and distinct products, but rather as a method of securing the satisfactory opening and closing of Fenestra windows by mechanical means. Therefore, any mechanical operators recommended by Fenestra representatives are just as dependable as the Fenestra butt or cam handle or any other standard device which the architect himself might specify.

All operating equipment, and especially electrically controlled equipment, needs occasional inspection and lubrication. Therefore, provision should be made by which powers and motors may be reached without undue inconvenience. A "cat walk" or a movable platform is suggested where ladders are impractical.

A plate door is sometimes installed in the fixed panels between the runs of Continuous Windows so that the powers may be reached from the roof. Such doors may be had at added cost if specified.

(SA) WORM AND GEAR OPERATOR—Specifications

Notes are explanatory or advisory only and need not be included in the specifications.

Note: This operator is designed primarily for horizontally pivoted ventilators but may, in some cases, be used on top pivoted ventilators.

(SA-1) Work Included

Note: List and locate. (See paragraph 13, Fenestra Page 2.)

(SA-2) General

All operators, so indicated, shall be *Fenestra* Worm and Gear as manufactured by Detroit Steel Products Company.

(SA-3) Material

(SA-3a) Power—Power shall be a machine cut, cast iron worm operating a cast iron segmental worm gear assembled in a steel power housing designed for adjustable attachment to the supporting bracket. The worm shall be equipped with a ball thrust bearing to eliminate friction. The hub of the segment gear shall be reamed to fit the power transmission line and shall be so rigidly secured as to rotate the line on the gear axis. Power shall be supported on heavy steel brackets adapted to rigid attachment to the building construction.

Note: Power may be erected in an inclined or inverted position to clear cranes, pipes or other obstructions. Note: The power may be located at either end of the run or at any intermediate point. Recommended limits are given on Fenestra Page 61.

(SA-3b) Power Transmission—Power line shall be 1″ black, wrought iron pipe joined into a continuous line by steel pipe plugs, with a drive fit, riveted in two directions. Line shall be supported on adjustable steel brackets, bolted to the window mullions or to the building construction. Adjustable steel operating arms (one to each ventilator) shall be rigidly clamped to the line and pivoted to steel arm extensions attached to the ventilators through steel hinge brackets.

(SA-3c) Manual Operation—

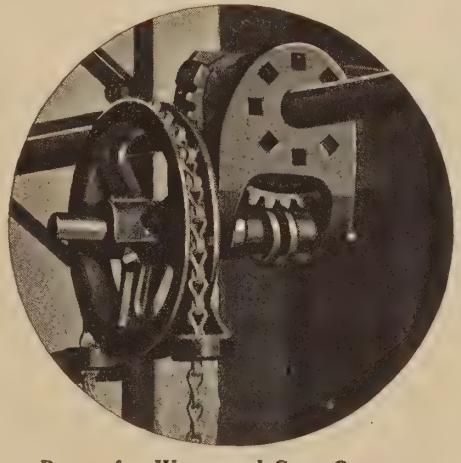
Note: Select type.

(1) ***Chain***—Power shall be operated by a chain, operating over a chain wheel. Chain shall be guided by a suitable guard. Hub of chain wheel shall be broached to accurately fit the flattened end of the worm shaft and shall be secured by a set screw. A cotter pin through end of the shaft shall be provided for additional protection.

Note: When the power must be erected in an inclined or inverted position (see Note SA-3a) to clear obstructions or to make the ventilators visible from the operating station, chain may be carried over idlers to any convenient point.

(2) ***Pipe***—Power shall be operated by a 1″ black, wrought iron pipe connected to the worm shaft and carried down vertically to a miter gear (with removable crank) encased in a gear box adapted to rigid attachment to the building construction approximately 4′ above the floor.

Note: When the power is installed in an inclined or inverted position (see Note SA-3-a) the pipe may be offset through the use of universal joints.



Power for Worm and Gear Operator

(SA-4) Painting

All operators shall be painted one (1) coat of red mineral paint by the manufacturer before shipment.

Note: Further painting should be provided for in the Painting Specifications.

Note: Where desired, the Fenestra Construction Company (see Paragraph 5, Fenestra Page 1), at reasonable added cost will do field painting after erection. If required, so specify, including specifications for paint and its application.

(SA-5) Erection

All operators shall be erected by the Fenestra Construction Company.

Note: See Paragraph 5, Fenestra Page 1.

All operators shall be erected in a thoroughly substantial, workmanlike manner and left in perfect working order.

(SB) RACK AND PINION OPERATOR—Specifications

Notes are explanatory or advisory only, and need not be included in the specifications.

Note: This operator is primarily adapted for use on ventilators pivoted 4″ from the top, but can be used successfully on horizontally pivoted ventilators.

(SB-1) Work Included

Note: List and locate. (See Paragraph 13, Fenestra Page 2.)

(SB-2) General

All Operators, so indicated, shall be *Fenestra* Rack and Pinion as manufactured by Detroit Steel Products Company.

(SB-3) Material

(SB-3a) Power—

Note: Three types of power are available. Select and specify that best adapted to the condition.

Note: Power may be located at either end of the run or at any intermediate point of the run. Recommended limits are given on Fenestra Pages 62 and 63.

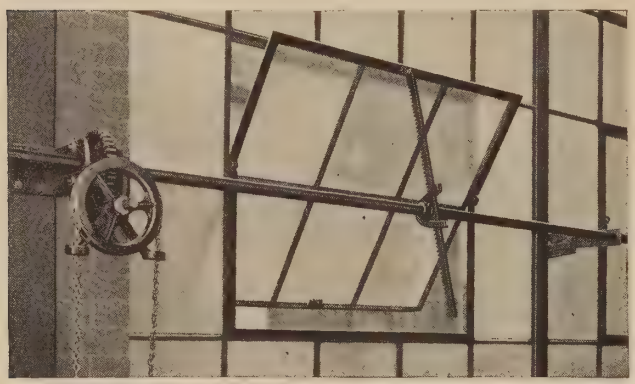
(1) ***Light Power***—Light Power shall be a 32 to 1 reduction, machine cut steel, worm operating a semisteel worm gear

assembled in a steel power housing designed for adjustable attachment to the supporting bracket. The worm shall be equipped with a ball thrust bearing to reduce friction. The hub of the gear shall be reamed to fit the power transmission line and shall be so rigidly secured as to rotate the line on the gear axis. Power shall be supported on a heavy steel bracket adapted to rigid attachment to the building construction.

Note: Power may be erected in an inclined or inverted position to clear cranes, pipes, or other obstructions.

(2) ***Heavy Power***—Heavy Power shall be a 45 to 1 reduction machine cut, steel worm operating a semisteel worm gear assembled and oil-encased in a dustproof gear box. The worm shall be equipped with a ball thrust bearing to reduce friction. The hub of the gear shall be reamed to fit the power transmission line to which it shall be securely attached so as to rotate the line on the gear axis. Power shall be supported on a heavy steel bracket adapted to rigid attachment to the building construction.

Note: Power may be erected in an inclined or inverted position to clear cranes, pipes, or other obstructions.



Rack and Pinion Operator, Manually Controlled

(3) ***Electrical Power***—Electrical Power shall be a 71 to 1 reduction, machine cut, steel worm operating a semisteel worm gear assembled and oil-encased in a dustproof gear box. The worm shall be equipped with a ball thrust bearing to reduce friction. The hub of the gear shall be reamed to fit the power transmission line and shall be so rigidly secured as to rotate the line on the gear axis. The power shall be operated by a cast iron sprocket wheel keyed to the worm shaft and motor driven through a chain drive. The electrical equipment shall be mounted directly beneath and joined to the power gear case forming a complete power unit. The power unit shall be supported on heavy steel brackets adapted to rigid attachment to the building construction.

Note: Complete specifications of Electrical Equipment are given on Fenestra Page 59 and should be included here.

(SB-3b) Power Transmission—Power Transmission lines shall be 1″ black, wrought iron pipe joined into a continuous line by steel pipe plugs, with a drive fit, riveted in two directions.

Lines shall be supported on adjustable, steel brackets, bolted to window mullions or to building construction.

Operating arms (one to each ventilator) shall be straight steel racks, clamped in mesh with pinions, rigidly secured to the line. (Arms shall be attached at the head of horizontally pivoted ventilators to pressed steel hinge brackets, and shall pull in.) (Arms shall be attached at the sill of top pivoted ventilators to Z bar brackets through pressed steel hinge brackets and shall push out.)

Note: Specify either or both arm attachments as required.

(SB-3c) Manual Operation—

Note: Select either type for "Light" or "Heavy" Power. Omit if Electric Power is used.

(1) ***Chain***—Power shall be operated by a chain operating over a chain wheel. Chain shall be guided by a suitable guard. Hub of chain wheel shall be broached to accurately fit the flattened end of the worm shaft and shall be secured by a set screw. A cotter pin through the end of the shaft shall be provided for additional protection.

Note: When the power must be erected in an inclined or inverted position (see Note SB-3a) to clear obstructions or to make the ventilators visible from the operating station, the chain may be carried over idlers to any convenient point.

(2) ***Pipe***—Power shall be operated by a 1″ black wrought iron pipe connected to the worm shaft and carried down vertically to a miter gear (with removable crank) encased in a gear box adapted to rigid attachment to the building construction approximately 4′ above the floor.

Note: When the power is installed in an inclined or inverted position (see Note SB-3a), the pipe may be offset through the use of universal joints.

(SB-3d) Electrical Operation—Power shall be electric, motor operated.

Note: See Electrical Power (SB-3a3).

(SB-4) Painting

All operators shall be painted with one (1) coat of red mineral paint by the manufacturer before shipment.

Note: Further painting should be provided for in the Painting Specifications.

Note: Where desired, the Fenestra Construction Company, *(see Paragraph 5, Fenestra Page 1,) at reasonable added cost, will do field painting after erection. If required so specify here, including specifications for paint and its application.*

(SB-5) Erection

All operators shall be erected by the Fenestra Construction Company.

Note: See Paragraph 5, Fenestra Page 1.

All operators shall be erected in a thoroughly substantial, workmanlike manner and left in perfect operating condition.

(SC) SCREW TYPE OPERATOR—Specifications

Notes are explanatory or advisory only and need not be included in the specifications

Note: This operator is designed primarily for use on exceptionally high openings such as those in power houses, entirely filled with windows and structural mullions. It may be used on either horizontally pivoted ventilators or ventilators pivoted 4″ from the top in individual bays, either within or beyond reach from the floor. The operator lies close to the inside face of the window out of the way of cranes and other obstructions. Where so provided for, powers and electrical mechanism may be concealed within the wall.

(SC-1) Work Included

Note: List and locate. (See Paragraph 13, Fenestra Page 2.)

(SC-2) General

All Operators, so indicated, shall be *Fenestra* Screw Type as manufactured by Detroit Steel Products Company.

(SC-3) Material

(SC-3a) Power—

Note: Two types of power are available. Select and specify that best adapted to the condition.

Note: The power may be located at either side of the opening or at any intermediate point. Recommended limits are given on Fenestra Pages 64 and 65.

Note: In bays of extreme width and height, flexibility of ventilator control may be secured by operating the upper runs from one power and the lower runs from another.

(1) ***Manual Power***—Power shall be applied through open bevel gears to operate a ¾″ vertical threaded, steel shaft in an upward and downward direction.

Note: The operation is similar to that of an automobile jack.

Gears shall be operated by a hand wheel provided with a handle.

The power shall be assembled within and shall be supported by an open, cast iron housing adapted to rigid attachment to the window mullion or building construction.

Provide a guide secured to the vertical shaft which shall fit over a guide T, attached to the window mullion. Guide T shall be provided with stops which shall limit the travel of the guide and shaft.

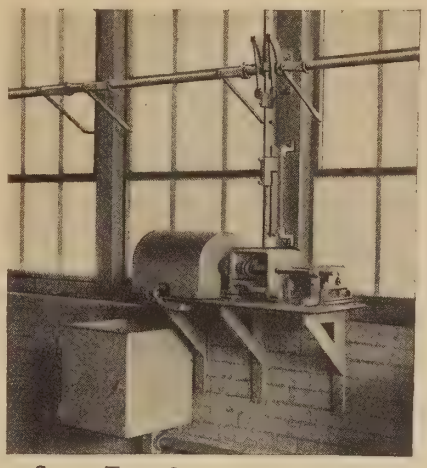
(2) *Electrical Power*—Power shall be applied through bevel gears to operate a ¾" vertical threaded, steel shaft in an upward and downward direction. The gears shall be assembled and oil-encased in a dust-proof gear-box. Gears shall be operated by electrical power either direct connected through a universal joint or by means of a cast iron sprocket and chain drive.

The electrical equipment and the gear case shall be mounted to form a complete unit on a heavy steel bracket plate adapted to rigid attachment to the building construction.

Note: Complete specifications of Electrical Equipment are given on Fenestra Page 59 and should be included here.

(SC-3b) Power Transmission—Power transmission lines shall be 1" black wrought iron pipe joined into a continuous line by steel plugs, with a drive fit riveted in two directions. Lines shall be supported close to the face of the window on heavy cast iron brackets rigidly attached to the mullions and building construction. Cast iron pivoted lever arms (two to each ventilator) shall be rigidly clamped to the power lines and attached to the ventilator jamb bars with malleable iron hinge brackets.

Heavy cast iron cross heads, secured to the vertical power shaft, shall operate attached cast iron rocker arms rigidly clamped to the power lines. When the power is applied the rocker arms shall rotate the power lines.



Screw Type Operator, Electrically Controlled

(SC-4) Painting

All operators shall be painted with one (1) coat of red mineral paint by the manufacturer before shipment.

Note: Further painting should be provided for in the Painting Specifications.

Note: Where desired the Fenestra Construction Company *(see Paragraph 5, Fenestra Page 1) at reasonable added cost will do field painting after erection. If required, so specify here, including specifications for paint and its application.*

(SC-5) Erection

All operators shall be erected by the Fenestra Construction Company.

Note: See Paragraph 5, Fenestra Page 1.

All operators shall be erected in a thoroughly substantial, workmanlike manner and left in perfect working order.

(SD) TENSION OPERATOR—Specifications

Notes are explanatory or advisory only and need not be included in the specifications.

Note: Tension Operators are in general design and operation similar to Continuous Operators. They are made for use on long runs of horizontally pivoted windows. The chief difference is in the design of operating arms and the chief advantages lie in its easy operation and the fact that windows up to 300′ may be operated from one power.

Note: To avoid repetition where the specifications are the same as that for Continuous Operator this is so noted. Where not identical, use clauses here given. For specification for Continuous Operator, see Fenestra Page 58.

(SD-1) Work Included

Note: Same as (SE-1).

(SD-2) General

All horizontally pivoted ventilator operators, so indicated, shall be *Fenestra* Tension Operators as manufactured by Detroit Steel Products Company.

(SD-3) Material

(SD-3a) Power—

Note: Same as (SE-3a).

(SD-3b) Stops—

Note: Include only where Manual operation is used.

On either side of the power case, the worm shaft shall extend to receive rigidly attached, double, steel, stop clutches (two in all). As the operator opens the window an auxiliary stop attached to the rack shall strike the upper end of a steel lever (pivoted to a bracket on the power case) causing the lower end of the lever (which is broached over the worm shaft) to engage one of the stop clutches and cut off the power. When the operator closes the window, a similar arrangement shall function to automatically cut off power at the proper point. Levers and clutches for each stop shall be automatically disengaged by coil springs. No stop which merely halts the movement of the power line without cutting off the power will be accepted.

(SD-3c) Power Supports—

Note: Same as (SE-3c).

(SD-3d) Power Transmission—

Note: Same as (SE-3d).

(SD-3e) Operating Arms—Operating arms shall be adjustable, straight, steel channels. Arms shall be rigidly attached, through a malleable iron and steel universal swivel clamp, to the tension line and the other end shall be secured to the top of the window through a steel pivoted hinge. Arms shall operate to pull the window in from the top.

(SD-3f) Manual Operation—

Note: Same as (SE-3f).

(SD-3g) Electrical Operation—

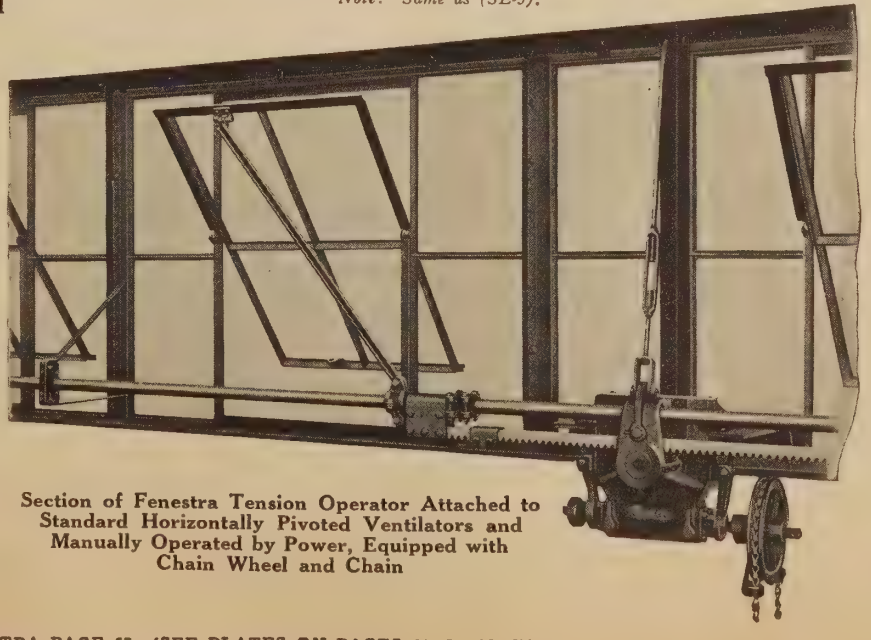
Note: Same as (SE-3g).

(SD-4) Painting

Note: Same as *(SE-4).*

(SD-5) Erection

Note: Same as (SE-5).



Section of Fenestra Tension Operator Attached to Standard Horizontally Pivoted Ventilators and Manually Operated by Power, Equipped with Chain Wheel and Chain

(SE) CONTINUOUS OPERATOR—Specifications

Notes are explanatory or advisory only and need not be included in the specifications.

Note: This operator is designed to operate from a single power, one or several continuous windows in line (top hung, or bottom hung) located in either vertical or sloping planes.

Note: The power developed through the tension line is applied to the window through straight motion levers so arranged that the leverage increases faster than the load thus making the operation continuously easier as the window opens. This is a basic principle exclusive in Fenestra Continuous Operator.

Note: The unusually heavy construction, and the extreme care with which all material is selected and fitted, give this power exceptional strength and reliability.

(SE-1) Work Included

Note: List and locate. (See Paragraph 13, Fenestra Page 2).

(SE-2) General

All continuous window operators shall be *Fenestra* Continuous Operators as manufactured by Detroit Steel Products Company.

(SE-3) Material

(SE-3a) Power—Power shall consist of a case hardened, machine cut, high carbon steel worm operating a special alloy, non-ferrous bronze, worm gear with straight face, machine cut teeth and extra heavy hub and rim.

Worm and gear shall be oil-encased, assembled in an accurately machined, oil-tight box. Worm and worm shaft shall be turned down from a solid steel bar. The worm shaft shall be made with long radial bearing surfaces and shall be provided with ball thrust, friction reducing bearings.

Note: The unusual length of the worm shaft radial bearing surfaces assures gear alignment and ease of operation without binding.

The worm gear shall fit tightly over a 1″ squared, steel shaft which shall extend to drive a high carbon steel, heat treated pinion in mesh with a rack.

Worm gear and pinion shall be separated by a spacer and all three shall be broached out to accurately fit the shaft with the permanence and reliability of a single piece.

The rack shall be of high carbon steel with machine-cut teeth of stub tooth design. The rack shall be suspended at each end from the power transmission tension line, by rigid rack hangers which thrust against clamps securely attached to the line, thus transmitting the power in a horizontal direction.

Note: The length of runs which may be operated from a single power can only be determined by consultation with a Fenestra representative since numerous factors must be considered, such as: the type of windows (top hung, bottom hung,, etc.), their location (vertical or horizontal plane), their height, the degree of opening desired, the time permitted for opening or closing, and, if manually operated, the effort to be exerted on the chain.

(SE-3b) Stop—

Note: Include only where Manual Operation is used.

Opposite the worm drive wheel, the worm shaft shall extend to receive a rigidly attached steel stop clutch. As the operator closes the window, an auxiliary stop attached to the rack, shall strike a malleable iron lever causing it to engage the stop clutch, and cut off the power. As the operator opens the window, the lever and clutch are disengaged automatically by a coil spring. No stop which merely halts the movement of the power line without cutting off the power will be accepted.

(SE-3c) Power Supports—Each power shall be supported by two steel brackets, especially designed to withstand great lateral pressure. Each bracket shall be rigidly attached to the building construction and shall be trussed with ½″ tension rods with adjusting U bolt hangers.

(SE-3d) Power Transmission—Power transmission (tension) line shall be 1″ black, wrought iron pipe in lengths not to exceed 20′, joined into a continuous line by solid steel plugs, with a drive fit, riveted in two directions.

Tension line shall be supported on 2″x3″ steel angle brackets with legs turned down, spaced approximately 10′ apart and rigidly attached to the building construction.

Brackets shall be slotted to permit adjustment and shall carry at their upper, outer ends, cast iron roller housings and solid steel rollers to support the tension line.

(SE-3e) Operating Arms—Operating arms or levers shall be steel angles consisting of two arms, one twice as long as the other.

Note: The operating arm assemblies are spaced in conjunction with the tension line brackets, approximately 10′ apart.

One end of the long arm shall be rigidly clamped through a universal pivoted joint, to the tension line and the other end shall be secured to the window through a universal pivoted joint bracket. One end of the short arm shall be attached through a universal pivoted joint to the top of the cast iron roller housing on the tension line support bracket, the other end being pivoted to the center of the long arm.

All universal joints shall be provided with bronze bushings.

(SE-3f) Manual Operation—Power shall be operated by a chain operating over a chain wheel. Chain shall be guided by a suitable guard. Hub of chain wheel shall be broached to accurately fit the extended, flattened end of the worm shaft and shall be secured by a set screw, a cotter pin through the end of the shaft providing additional protection.

Note: To clear obstructions or make the windows visible from the operating station, chain may be carried over idlers to any convenient point.

(SE-3g) Electrical Operation—Power shall be operated by an electrical power unit operating through a sprocket and chain. Hub of sprocket shall be keyed to the extended end of the worm shaft. Electrical power unit shall be mounted beneath and secured to the power by rigidly attached auxiliary steel brackets.

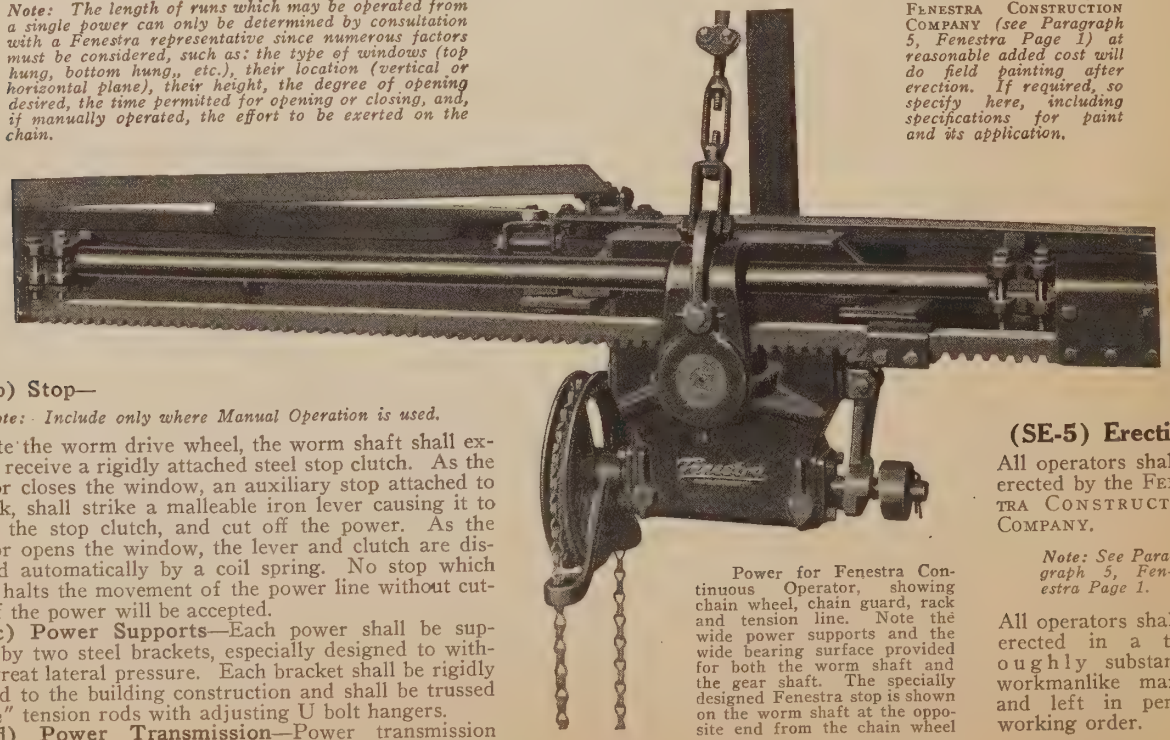
Note: Complete specifications of Electrical Equipment given on Fenestra Page 59, should be included here.

(SE-4) Painting

All operators shall be painted one (1) coat of red mineral paint by the manufacturer before shipment.

Note: Further painting should be provided for in the Painting Specifications.

Note: Where desired, the Fenestra Construction Company (see Paragraph 5, Fenestra Page 1) at reasonable added cost will do field painting after erection. If required, so specify here, including specifications for paint and its application.



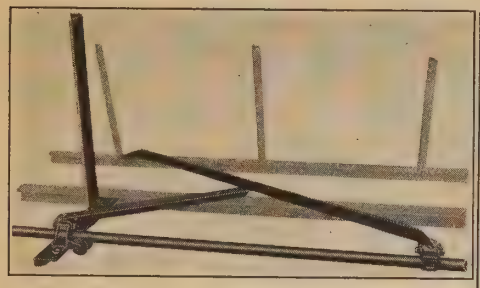
Power for Fenestra Continuous Operator, showing chain wheel, chain guard, rack and tension line. Note the wide power supports and the wide bearing surface provided for both the worm shaft and the gear shaft. The specially designed Fenestra stop is shown on the worm shaft at the opposite end from the chain wheel

(SE-5) Erection

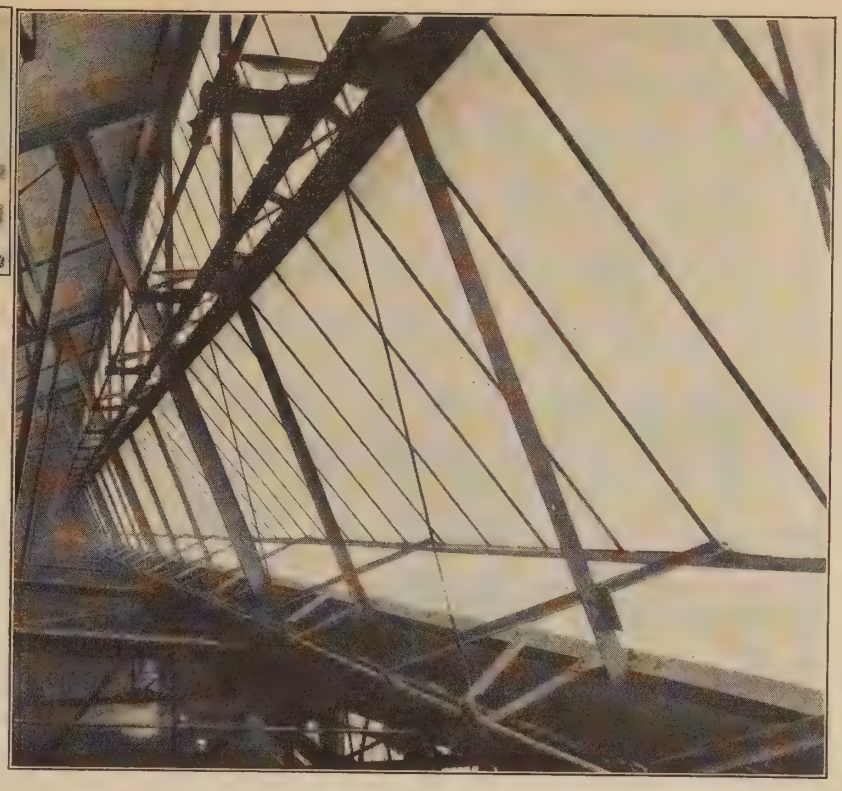
All operators shall be erected by the Fenestra Construction Company.

Note: See Paragraph 5, Fenestra Page 1.

All operators shall be erected in a thoroughly substantial, workmanlike manner and left in perfect working order.



Above is shown a "close up" of the power transmission on Fenestra Continuous Operator. Note the 2x3 in. steel angle bracket supporting the line; the two operating arms, one twice as long as the other: one end of the long arm clamped to the pipe through a universal joint and the other attached to the window. The short arm is attached to the top of the cast iron roller housing while the other end is pivoted to the center of the long arm. For detailed description, see Paragraph SE-3e, Fenestra Page 58



At the right is shown part of two runs of Fenestra Continuous Operator as installed in the plant of the Commonwealth Steel Co., Granite City, Ill. The upper run of windows is closed while the lower run is partially open. This picture illustrates very well the operation of long runs of continuous top hung windows from a single power

CONTINUOUS WINDOW OPERATOR(CABLE TYPE)

Note: This operator is primarily adapted to use on Vertically Pivoted Windows.

The operator is designed for either hand or electrical trical operation and is identical to the continuous window mechanical operator except in one respect. Both ends of the transmission line are connected to chains which pass over roller bearing idlers rigidly supported on steel idler brackets (guyed to the building construction where possible) and are attached to continuous steel rods. The steel rods are carried directly beneath the transmission tension line and are supported through holes in the tension line brackets. The ends of the steel rods next the power are connected to either end of the power rack. The proper tension in rods is accomplished through turn buckles furnished in the rod lines.

In this operator the transmission line (the 1" pipe) is always in tension both when opening and closing the windows. For details, see Fenestra Page 72.

(SF) ELECTRICAL EQUIPMENT FOR OPERATORS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications

(SF-1) Work Included

Note: List and locate. See Paragraph 13, Fenestra Page 2.

(SF-2) General

All Mechanical Operators, electrically controlled, shall be provided by the Operator Manufacturer, with complete electrical equipment, as hereinafter specified. The operator manufacturer shall provide complete wiring diagrams.

(SF-3) Electrical Equipment

(SF-3a) Motors—Motors shall be of type best adapted to the power equipment, of high torque and ample horsepower.

Note: Motors operating on 220 volt or 440 volt, 60 cycle, 3 phase alternating current are recommended. Direct current motors are not carried in stock, but if alternating current is not available, a special motor for 230 volt, direct current, can be supplied.

Note: Specify current furnished.

(SF-3b) Power Connections—Motors shall be connected to power by means of sprockets and chains, or direct connected through universal joints as best adapted to power requirements.

(SF-3c) Reversing Switches—Standard Magnetic Reversing Switches shall be enclosed in steel boxes and so designed, that the movement of the ventilator, either in opening or closing may be stopped or started at any point by manipulation of push buttons.

(SF-3d) Limit Switches—Limit Switches shall be positive in action and rigidly attached to the power to form an integral part of the power unit. All limit switches shall be enclosed, yet accessible for adjustment so as to positively limit the motion of the ventilator in either direction.

(SF-3e) Push Button Stations—Push Button Stations "open," "close" and "stop" shall be of rugged construction to withstand hard usage. Buttons shall be recessed in cover so that they cannot be accidently operated.

(SF-4) Electrical Construction

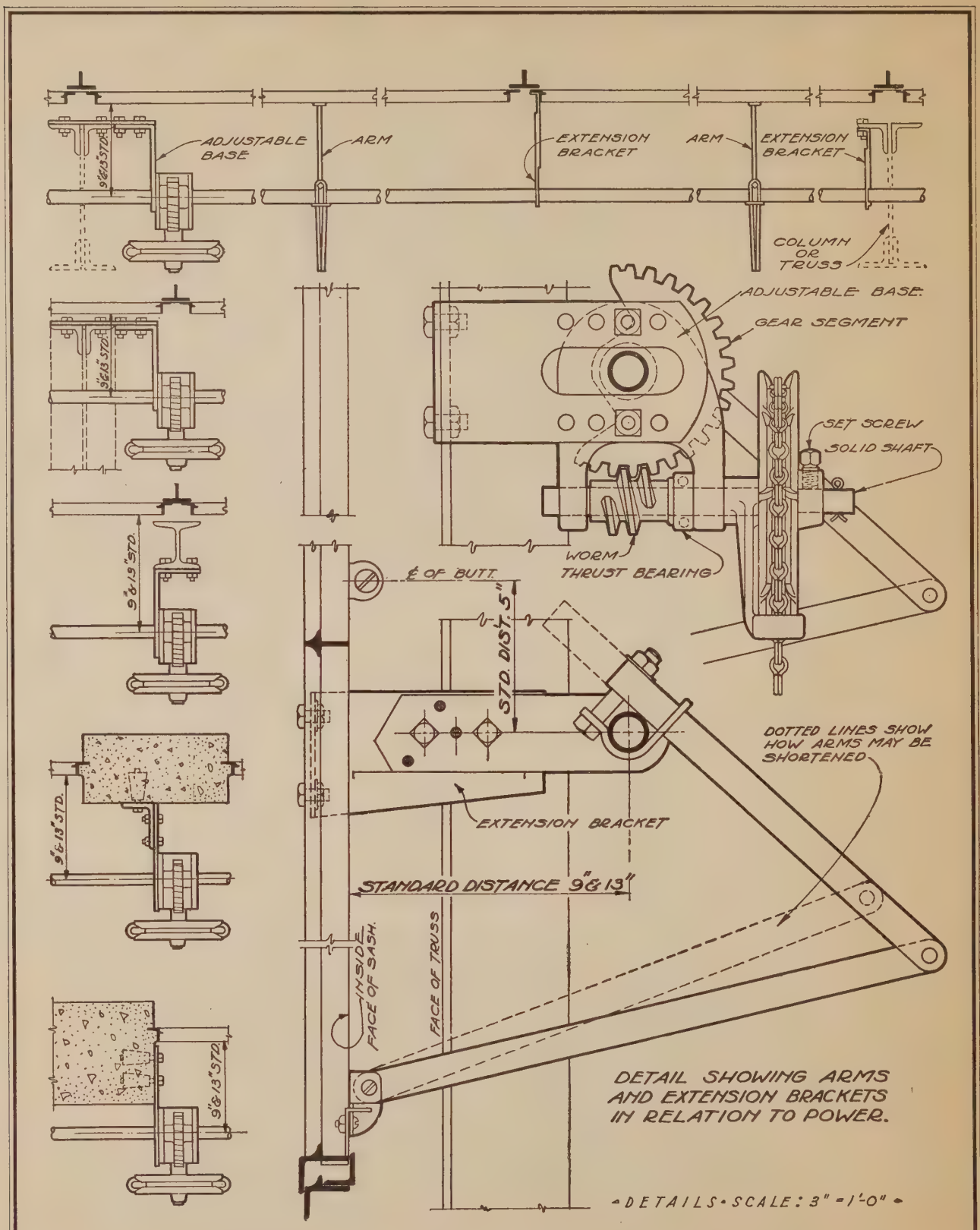
Note: The following provisions should be made in the Electrical Specifications.

The Electrical Contractor shall install magnetic reversing switches and push button stations and shall furnish and install safety type, line switches. He shall also furnish all conduit, fittings and wire and do all wiring in accordance with the wiring diagram between the Electrical Equipment furnished by the Window Operator Manufacturer and that furnished by himself.

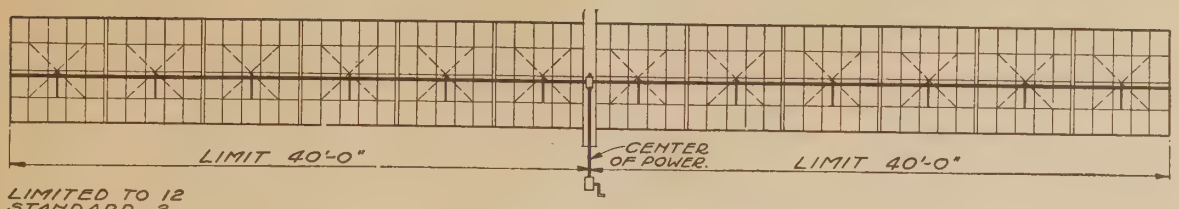
All materials and workmanship shall meet the requirements of the National Electric Code and all Local and State Inspection Bureaus.

Conduit shall be galvanized or black enameled. Wire shall be rubber covered N. E. C. Exposed conduit shall be run in a systematic, sightly manner, parallel with structural features of the building and rigidly and neatly secured. Where walls are plastered, conduit shall be concealed.

The Electrical Contractor shall carry fire, workmen's compensation, and public liability insurance. He shall guarantee his work for a period of one year after completion. Defects in the work and material furnished by him, developing during the above named period shall be promptly and satisfactorily made good at his expense.

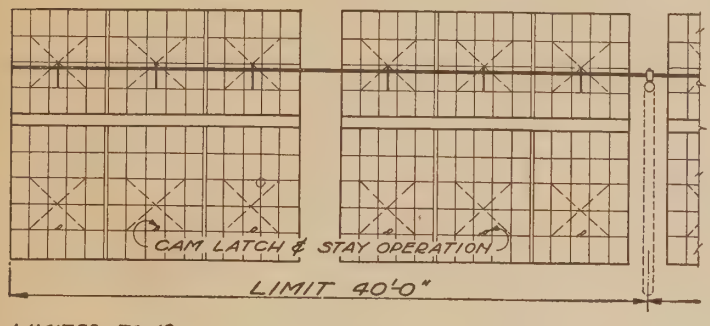


Fenestra August 1927	Worm and Gear Operator Typical Details	Plate No S-101



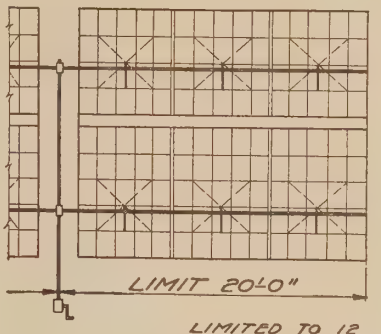
LIMITED TO 12 STANDARD 2 PANE HIGH VENTS.

TYPICAL SINGLE RUN



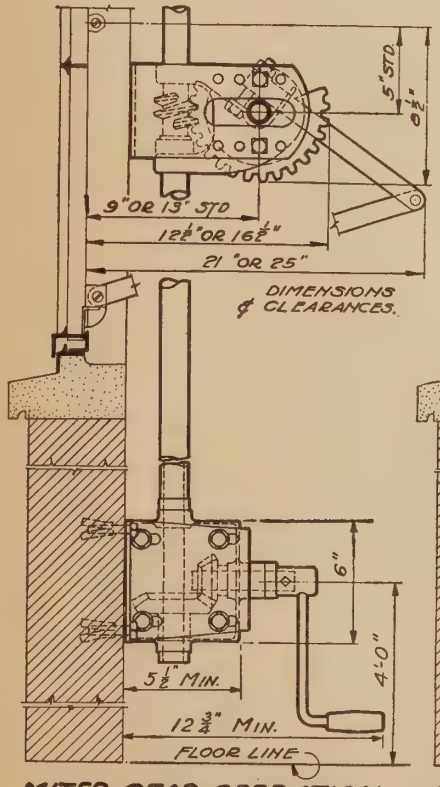
LIMITED TO 12 STANDARD 2 PANE HIGH VENTS.

TYPICAL SINGLE RUN

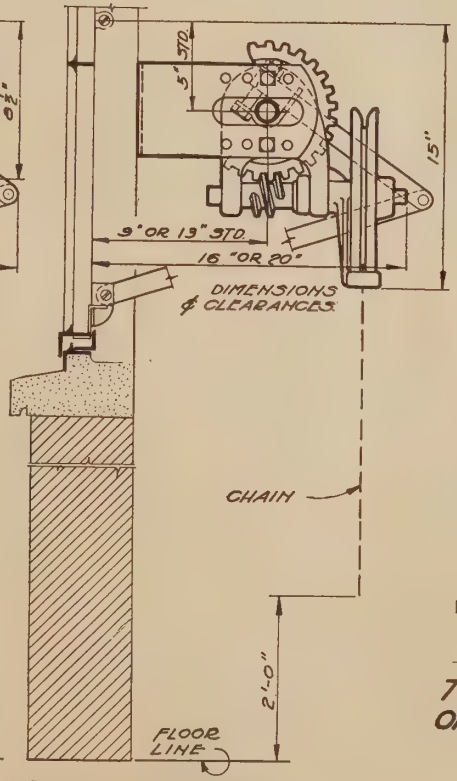


LIMITED TO 12 STANDARD 2 PANE HIGH VENTS

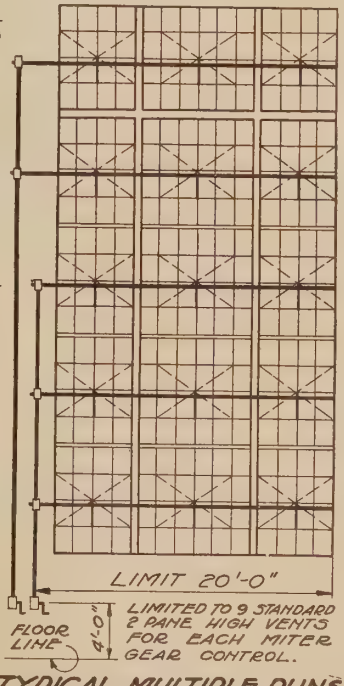
TYPICAL DOUBLE RUN



MITER GEAR OPERATION



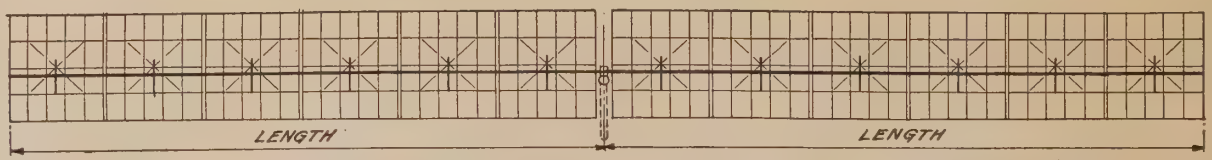
CHAIN OPERATION



TYPICAL MULTIPLE RUNS OPERATED IN SINGLE BAYS.

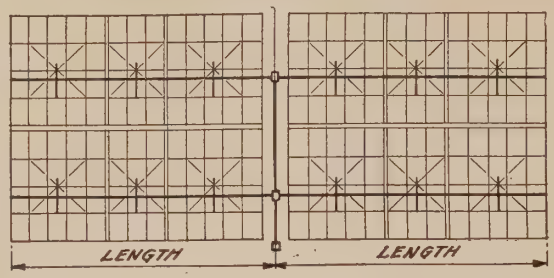
• DETAILS • SCALE: 1½" = 1'-0" •

Fenestra, August 1927	Worm and Gear Operator Bay Operation	Plate No S-102



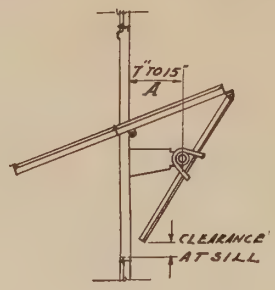
HEAVY POWER-LIMIT EACH SIDE, 150'-0" AND 30 HORIZONTALLY PIV. VENTS OR 100'-0" AND 20 TOP PIV. VENTS.
LIGHT POWER-LIMIT EACH SIDE, 100'-0" AND 20 HORIZONTALLY PIV. VENTS OR 60'-0" AND 10 TOP PIV. VENTS.

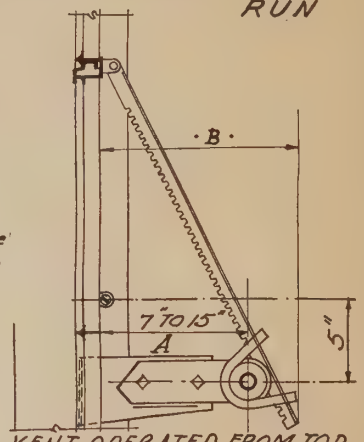
TYPICAL SINGLE RUN



LENGTH LIMITED TO HALF THAT OF SINGLE RUNS WITH TOTAL NUMBER OF VENTS THE SAME.

TYPICAL DOUBLE RUN

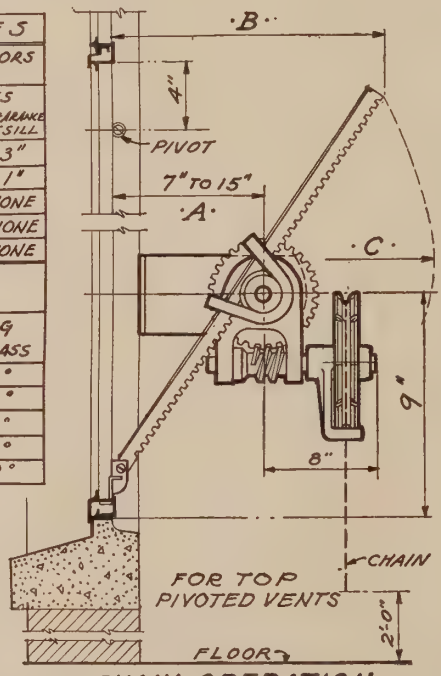




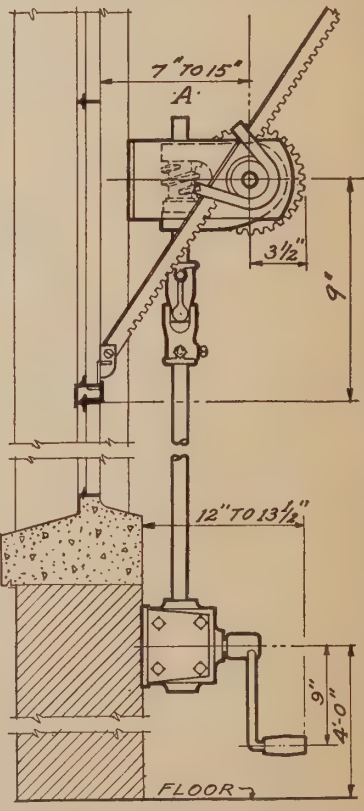
VENT OPERATED FROM TOP

TABLE OF CLEARANCES — TWO PANE HIGH VENTILATORS PIVOTED 2" ABOVE CENTER						
		18" GLASS			20" GLASS	
A	B	ANGLE OPNG.	CLEARANCE AT SILL	B	ANGLE OPNG.	CLEARANCE AT SILL
7	12	60°	NONE	11	90°	3"
9	14½	70°	NONE	13½	90°	1"
11	16½	80°	NONE	15½	80°	NONE
13	18½	90°	NONE	17½	90°	NONE
15	21	90°	NONE	20	90°	NONE

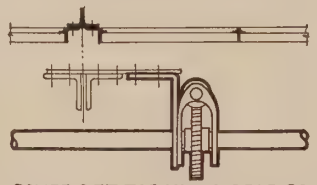
TWO PANE HIGH TOP PIVOTED VENTILATORS				
			ANGLE OF OPENING	
A	B	C	18" GLASS	20" GLASS
7	24½	28	60°	50°
9	29½	30	60°	50°
11	31½	31	50°	50°
13	33½	33	50°	40°
15	35½	35	40°	40°



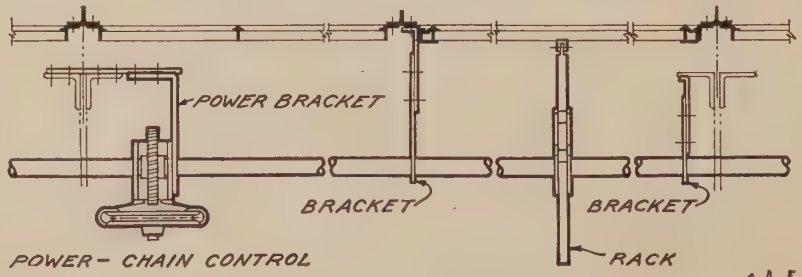
CHAIN OPERATION



MITER GEAR OPERATION



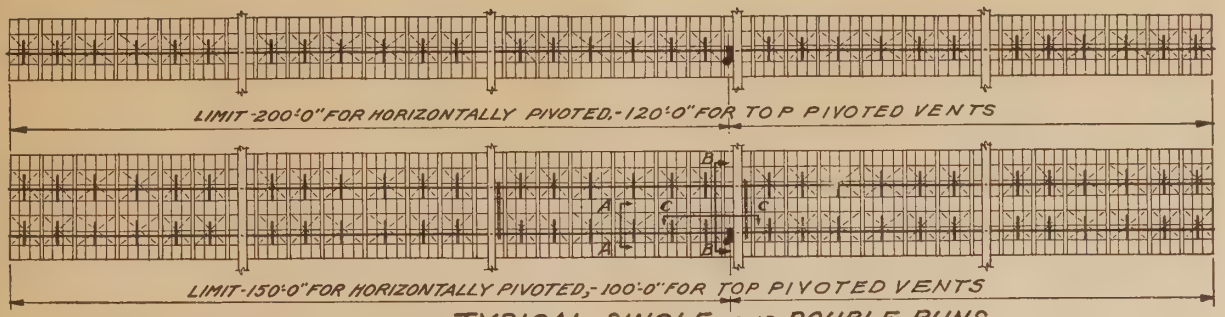
POWER SET FOR MITER GEAR CONTROL



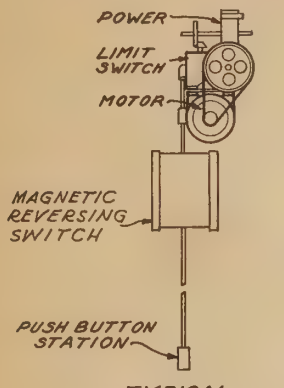
POWER - CHAIN CONTROL

DETAILS - SCALE: ¾" = 1'-0"

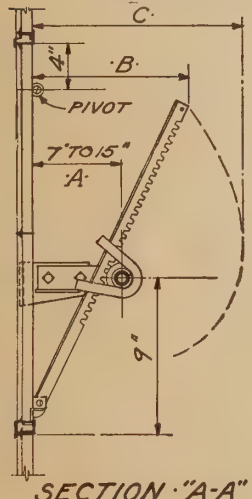
Fenestra August 1927	Rack and Pinion Operator — Typical Details	Plate No S-201


LIMIT-200'-0" FOR HORIZONTALLY PIVOTED,-120'-0" FOR TOP PIVOTED VENTS
LIMIT-150'-0" FOR HORIZONTALLY PIVOTED,-100'-0" FOR TOP PIVOTED VENTS

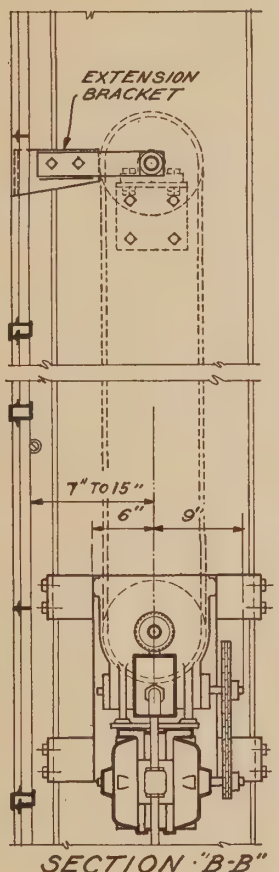
TYPICAL SINGLE AND DOUBLE RUNS.



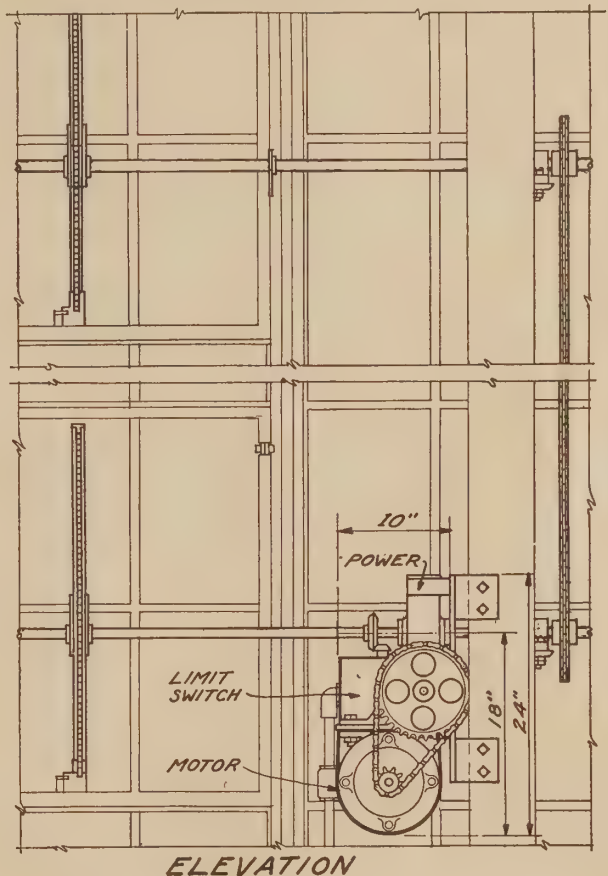
TYPICAL INSTALLATION



SECTION "A-A"

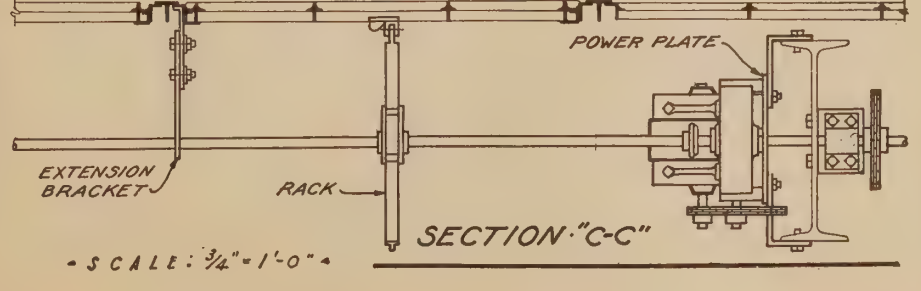


SECTION "B-B"



ELEVATION

CLEARANCES FOR RACK TWO PANE HIGH TOP PIVOTED VENTS.				
A	B	C	OPENING ANGLE 16" GLASS	OPENING ANGLE 20" GLASS
7	24½	28	60°	50°
9	29½	30	60°	50°
11	31½	31	50°	50°
13	33½	33	50°	40°
15	35½	35	40°	40°



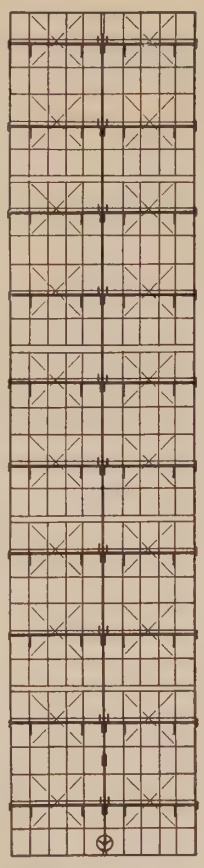
SECTION "C-C"

SCALE: 3/4" = 1'-0"

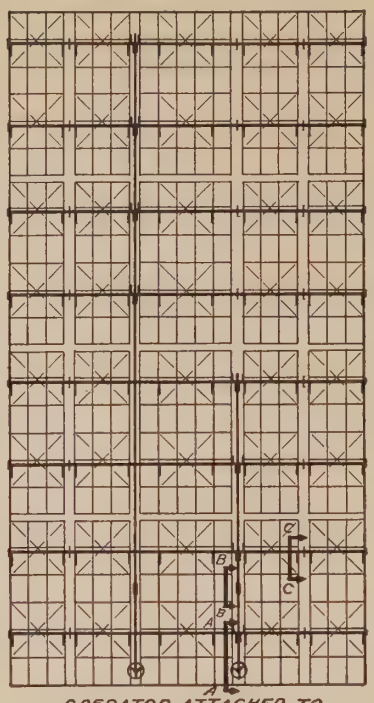
Fenestra
August 1927

Rack and Pinion Operator
Electrically Controlled

Plate No
S-202



OPERATOR ATTACHED TO T-BAR MULLION

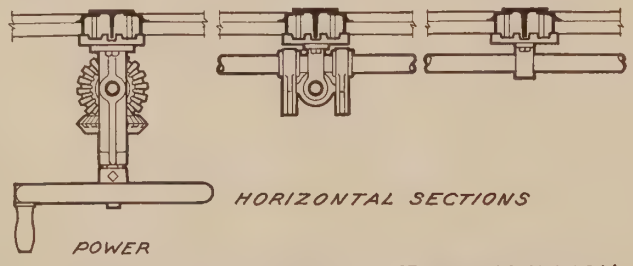


OPERATOR ATTACHED TO STRUCTURAL MULLION

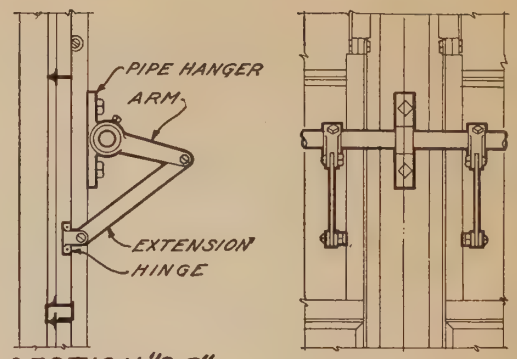
NOTE

ONE POWER IS LIMITED TO OPERATE TWENTY, TWO PANE HIGH TOP PIVOTED VENTS TO OPEN OUT; OR FIFTY, TWO PANE HIGH VENTS PIVOTED 2" ABOVE CENTER. ONE FIXED PANE AT SILL REQUIRED FOR POWER CLEARANCE.

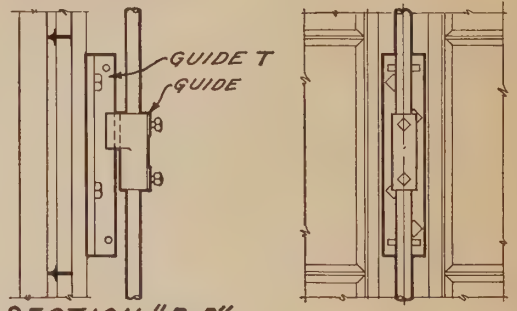
TYPICAL INSTALLATIONS



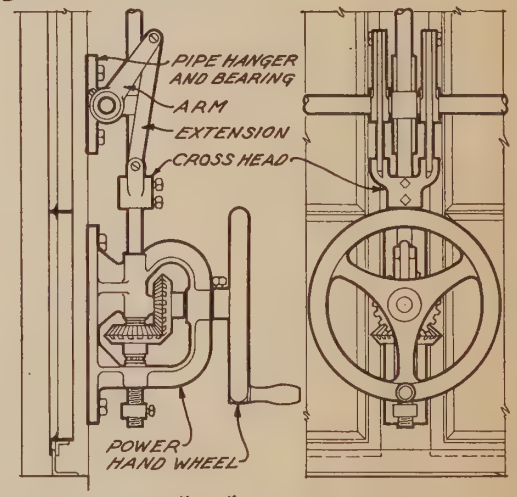
OPERATOR ATTACHED TO T-BAR MULLION



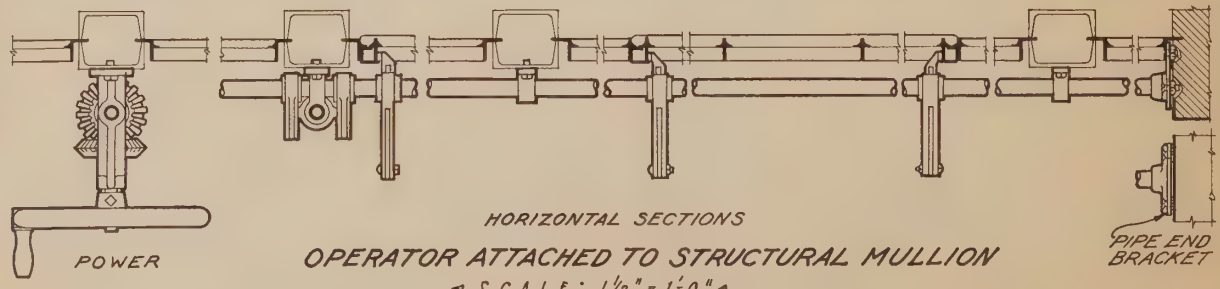
SECTION "C-C"



SECTION "B-B"



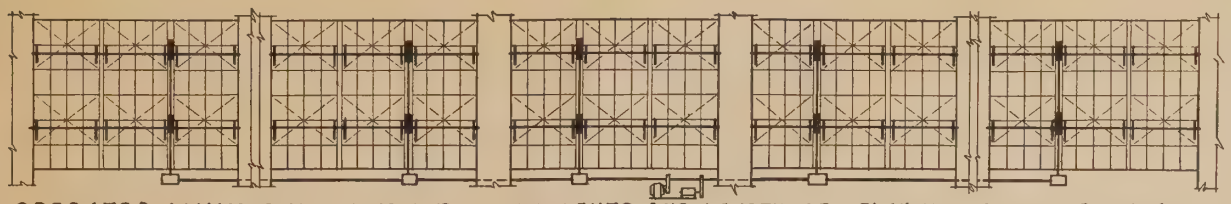
SECTION "A-A" ELEVATION



OPERATOR ATTACHED TO STRUCTURAL MULLION

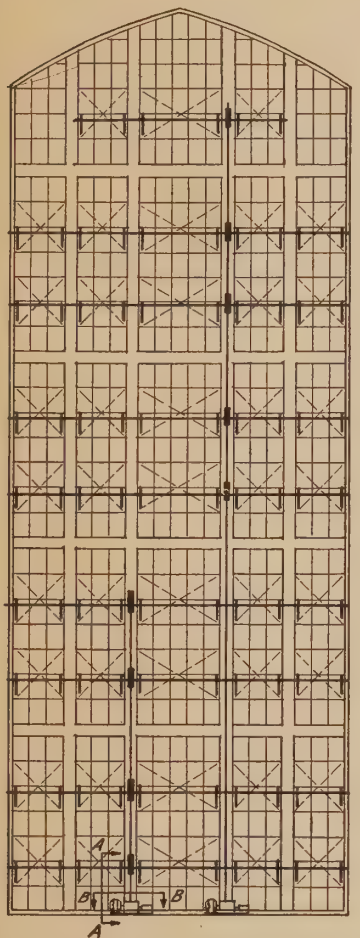
SCALE: 1½" = 1'-0"

Fenestra, August 1927	Screw Type Operator — Typical Details	Plate No. S-301



OPERATOR LIMITED TO 48 TOP PIVOTED VENTS AND LENGTH OF 75'-0" EITHER SIDE OF THE MOTOR, OR 120 VENTS CENTER PIVOTED AND LENGTH OF 75'-0" EITHER SIDE OF THE MOTOR.

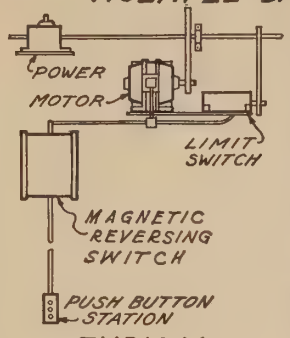
MULTIPLE BAY OPERATION



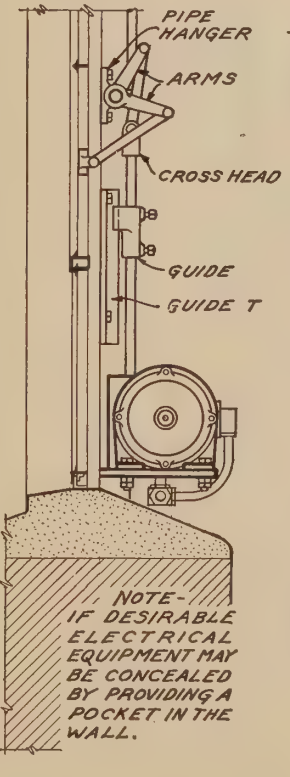
SINGLE BAY OPERATION

OPERATOR LIMITED TO 8 TIERS AND 24 TOP PIVOTED VENTS OR 8 TIERS & 48 VENTS CENTER PIVOTED.

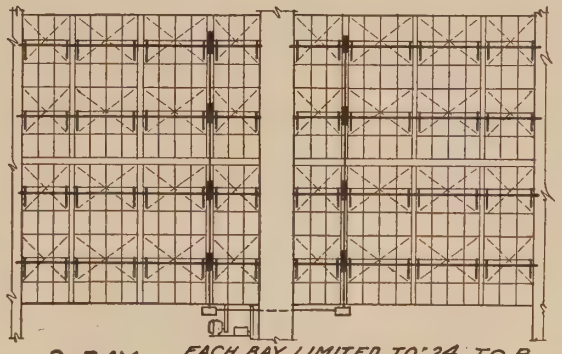
PLAN



TYPICAL INSTALLATION

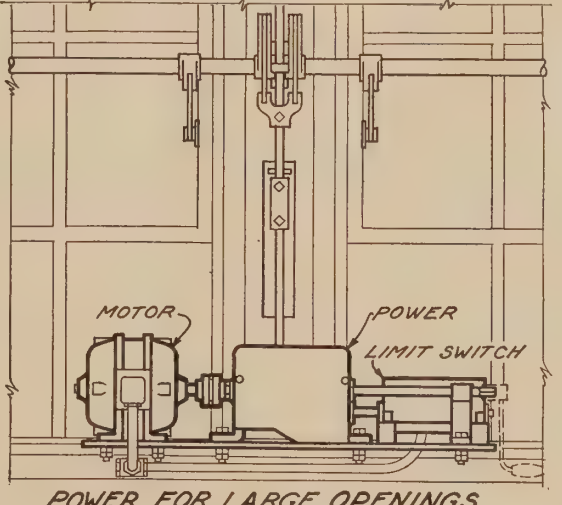


SECTION "A-A"

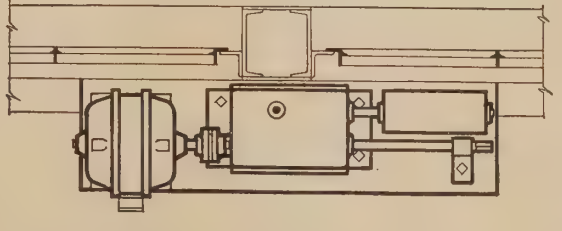


2 BAY OPERATION

EACH BAY LIMITED TO 24 TOP PIVOTED VENTS OR TO 48 VENTS CENTER PIVOTED.



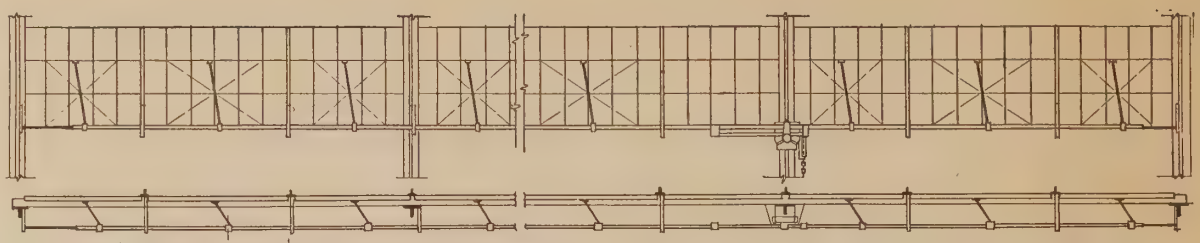
POWER FOR LARGE OPENINGS



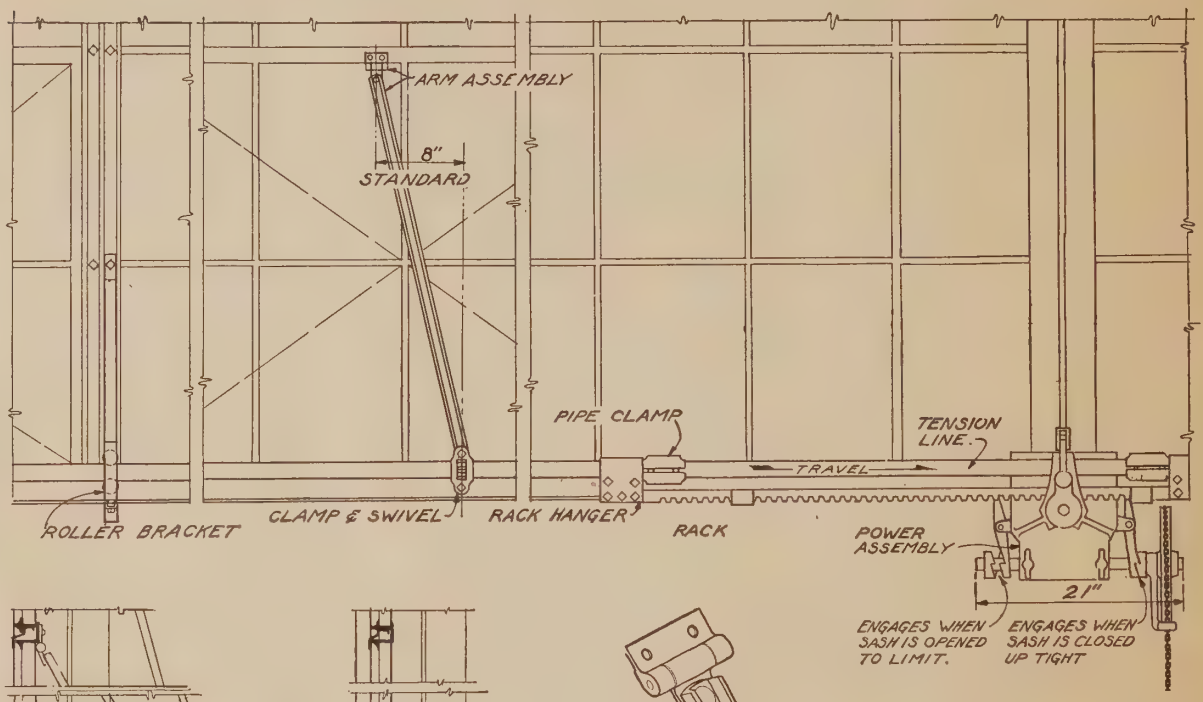
PLAN-POWER FOR LARGE OPENINGS.

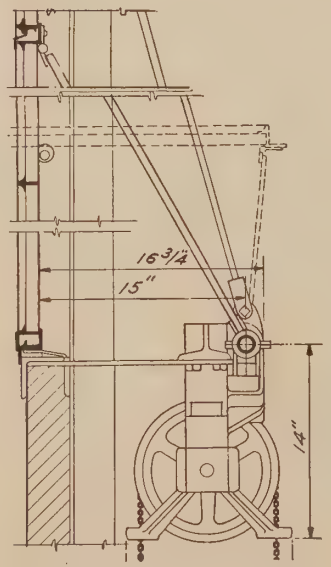
SCALE: 3/4" - 1'-0"

Fenestra, August 1927	Screw Type Operator Electrically Controlled	Plate No S-302

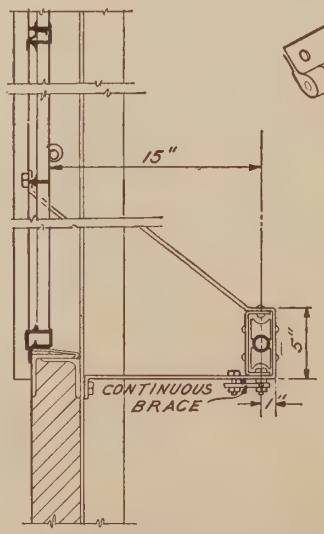


SKETCH SHOWING LAYOUT OF TENSION OPERATOR.

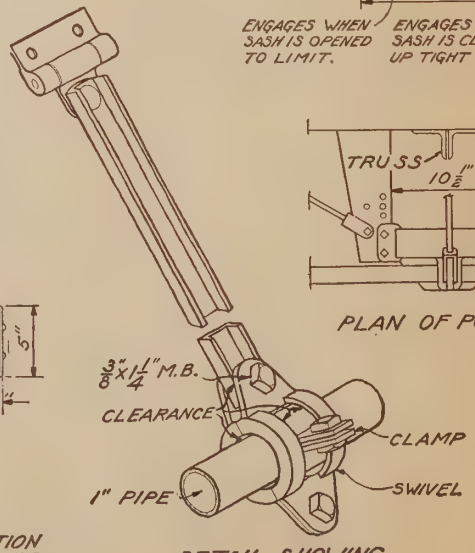




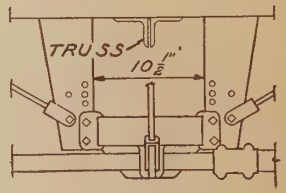
CLEARANCE FOR OPERATOR



DETAIL SHOWING LOCATION OF ROLLER BRACKETS AND THEIR CLEARANCES.

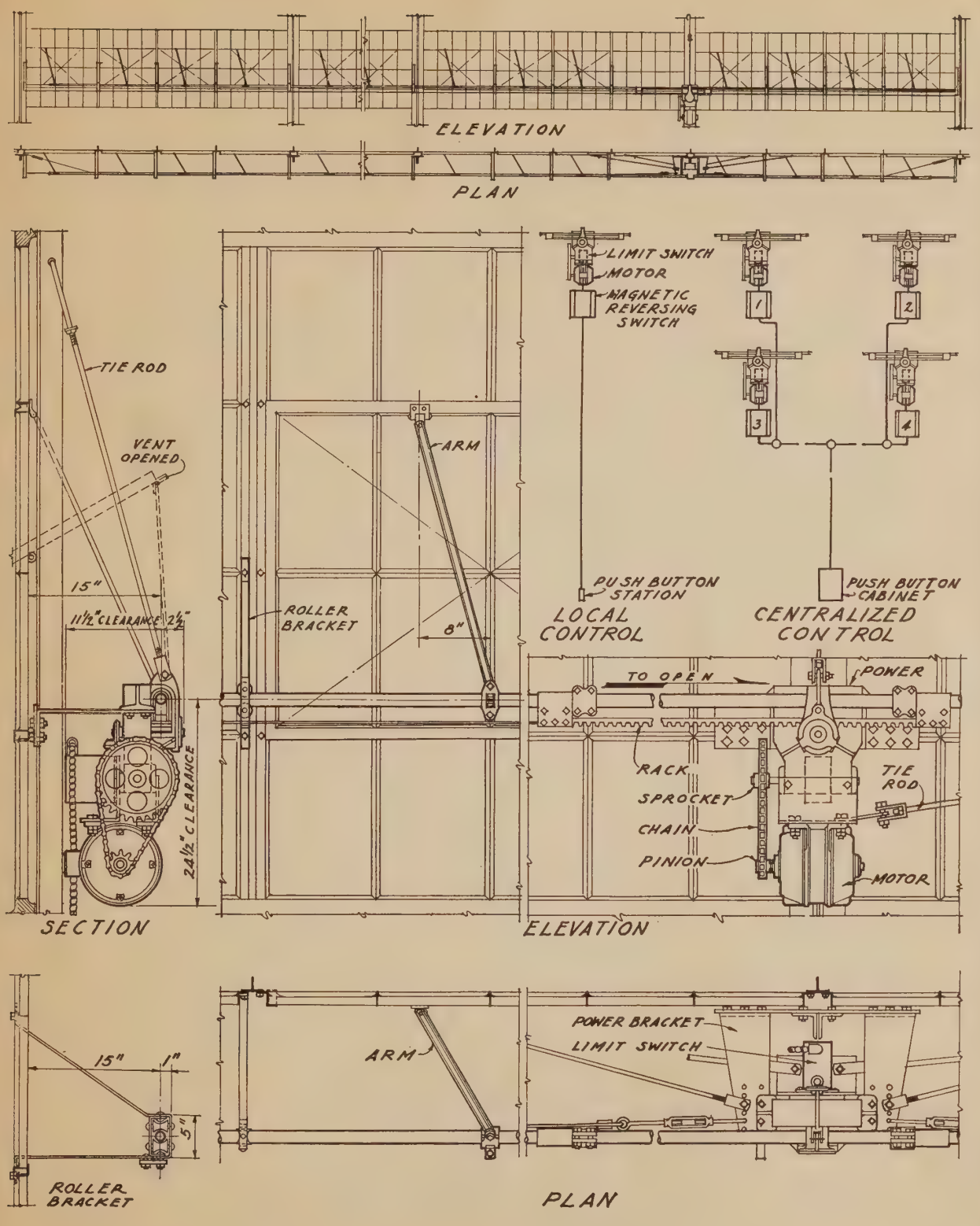


DETAIL SHOWING DESIGN OF SWIVEL

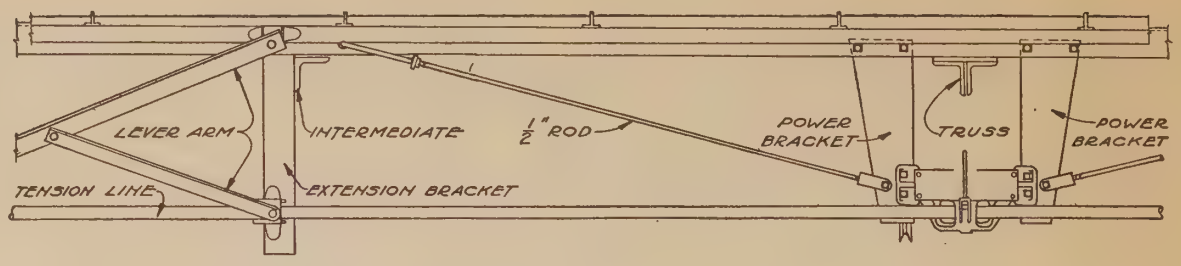


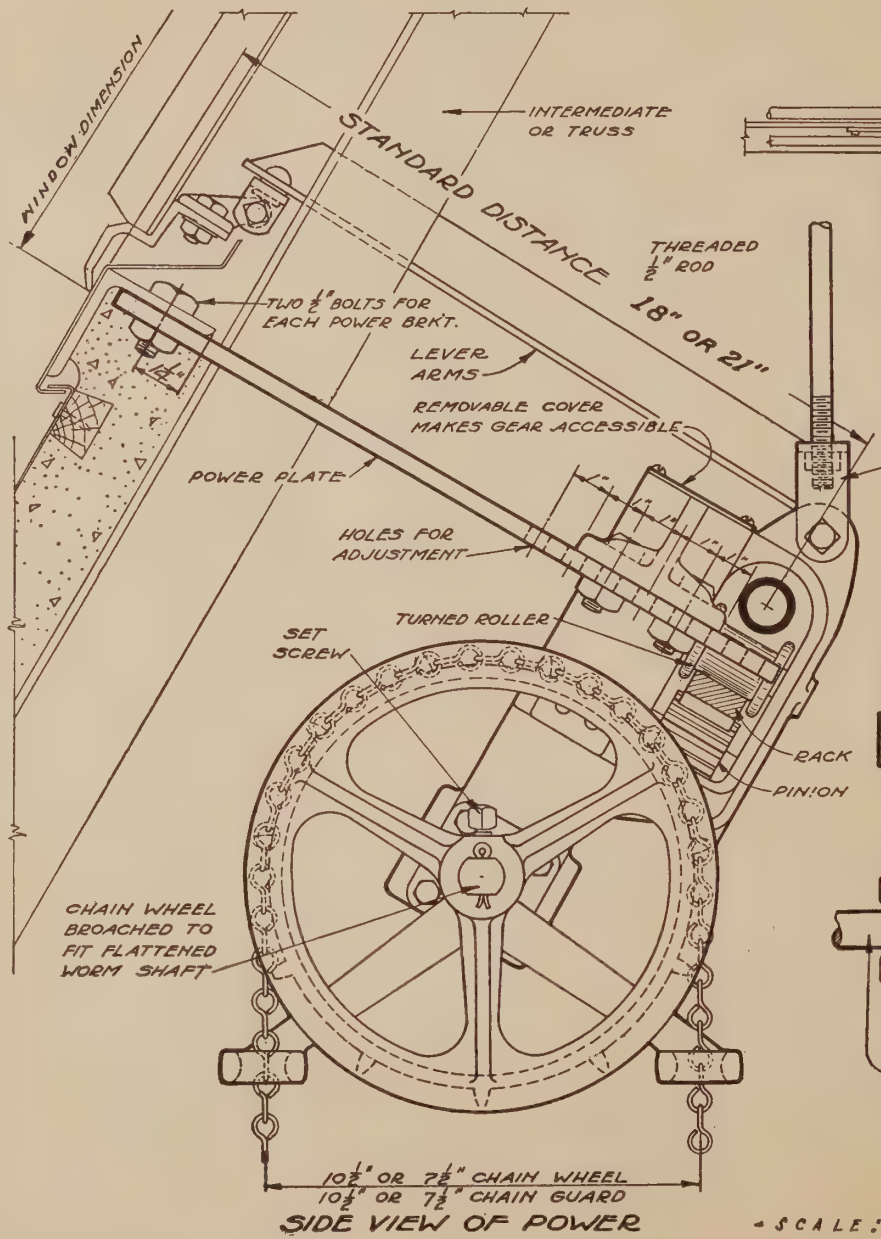
PLAN OF POWER.

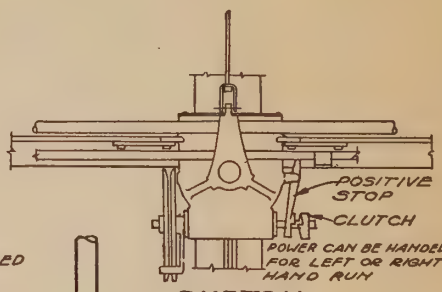
Fenestra, *August 1927*	**Tension Type Operator** *Typical Details*	**Plate No** *S-401*

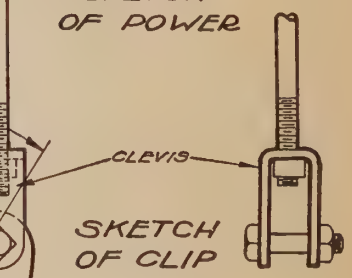


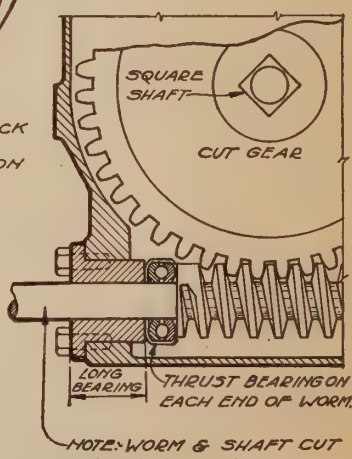
Fenestra, August 1927	Tension Type Operator Electrically Controlled	Plate No S-402





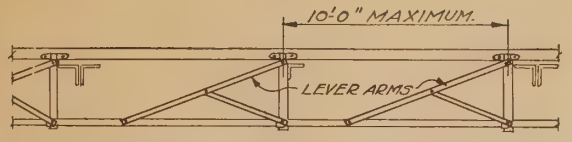




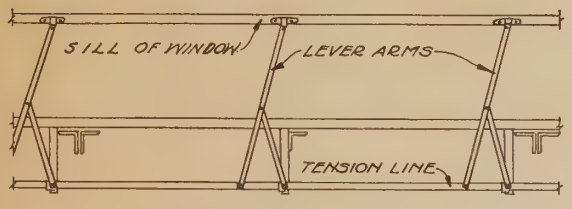


SCALE: HALF · FULL · SIZE

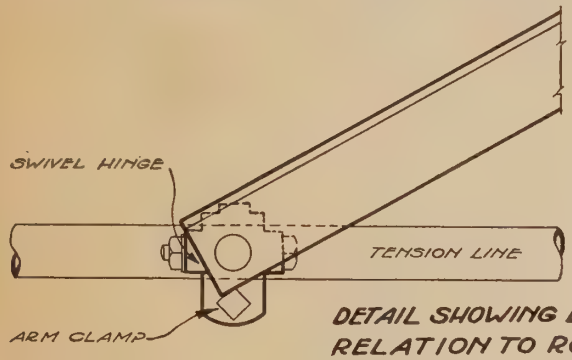
Fenestra, August 1927	Continuous Type Operator Typical Details	Plate No. S-501

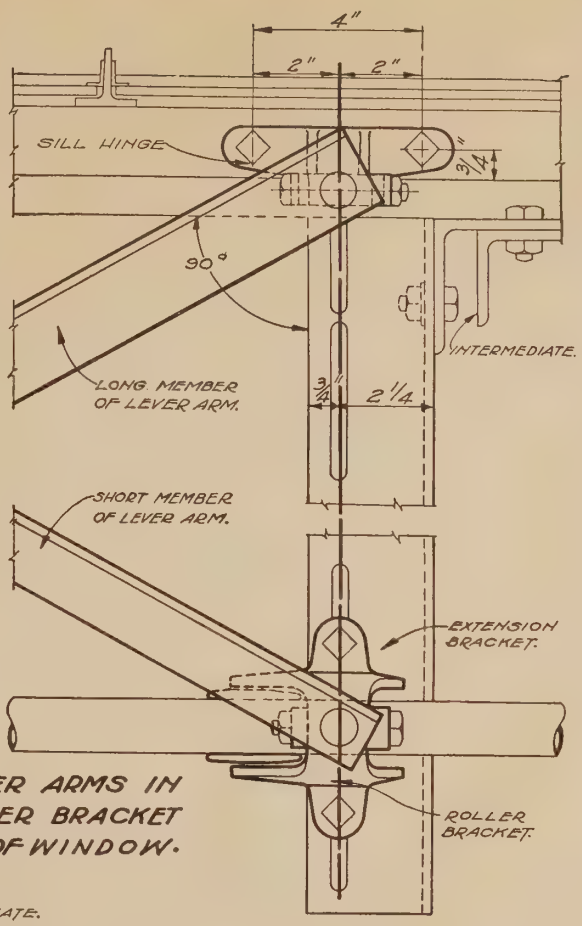


DETAIL OF LEVER ARMS IN CLOSED POSITION

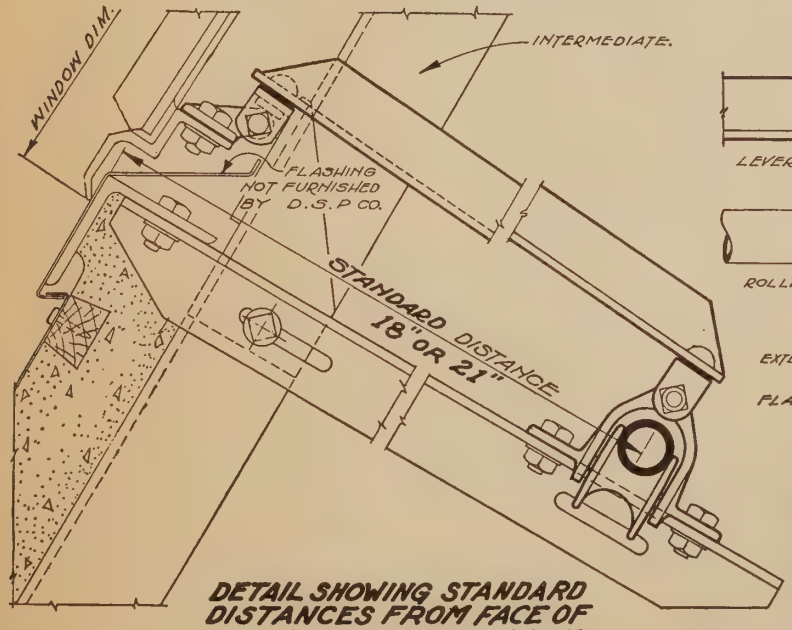


DETAIL OF LEVER ARMS IN OPEN POSITION.

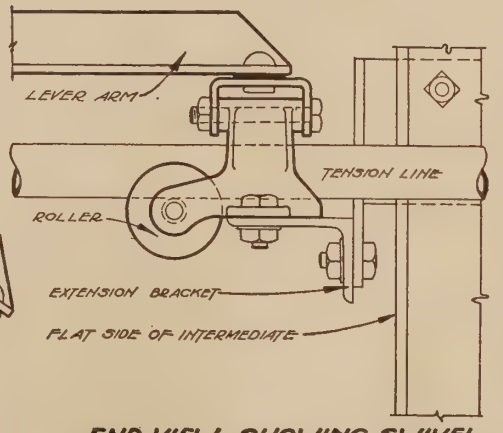




DETAIL SHOWING LEVER ARMS IN RELATION TO ROLLER BRACKET AND SILL HINGE OF WINDOW.



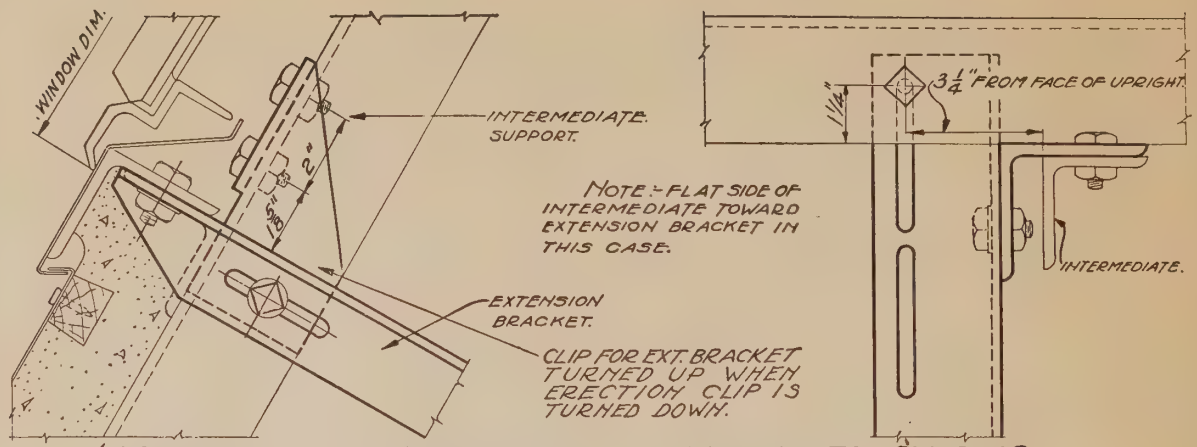
DETAIL SHOWING STANDARD DISTANCES FROM FACE OF SILL TO TENSION LINE



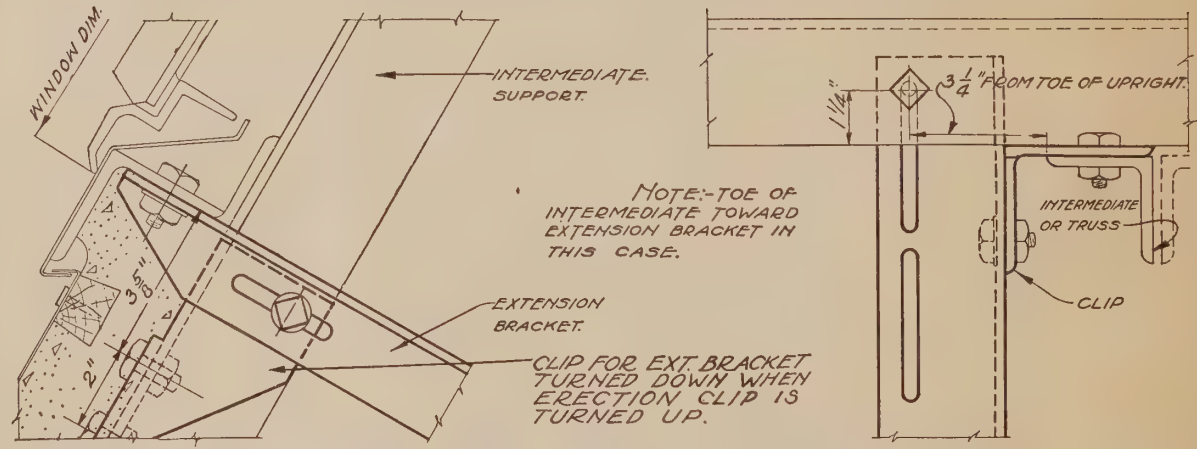
END VIEW SHOWING SWIVEL HINGE OF LEVER ARM AND ALSO ROLLER SUPPORT FOR TENSION LINE.

•SCALE: HALF FULL SIZE•

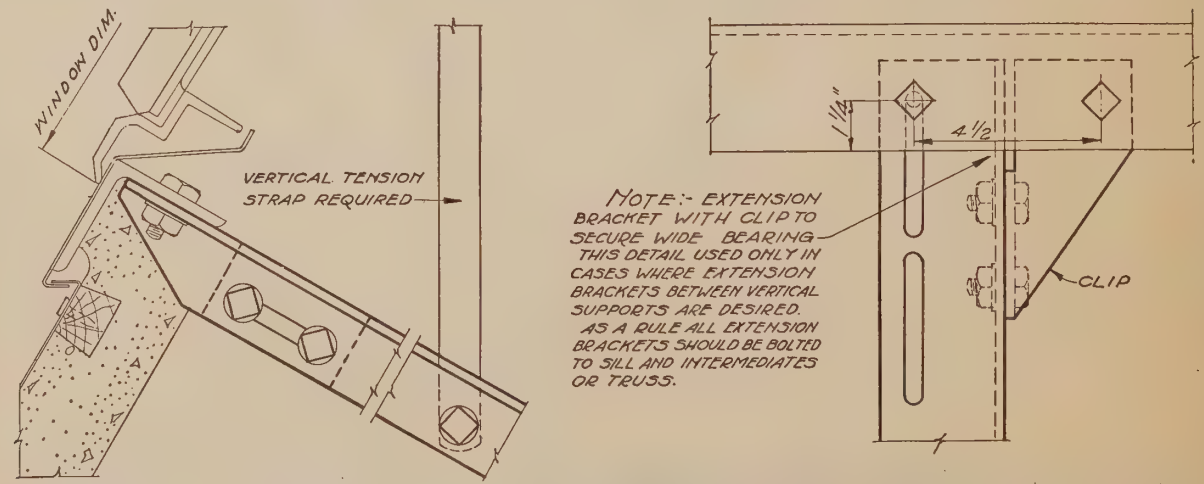
Fenestra, August 1927	Continuous Type Operator Lever Arm Assembly	Plate No S-502


WINDOW DIM.
INTERMEDIATE SUPPORT.
2"
EXTENSION BRACKET.
CLIP FOR EXT. BRACKET TURNED UP WHEN ERECTION CLIP IS TURNED DOWN.
NOTE:- FLAT SIDE OF INTERMEDIATE TOWARD EXTENSION BRACKET IN THIS CASE.
3 1/4" FROM FACE OF UPRIGHT.
1 1/4"
INTERMEDIATE.

BRACKET BOLTED TO SILL & INTERMEDIATE BY CLIP



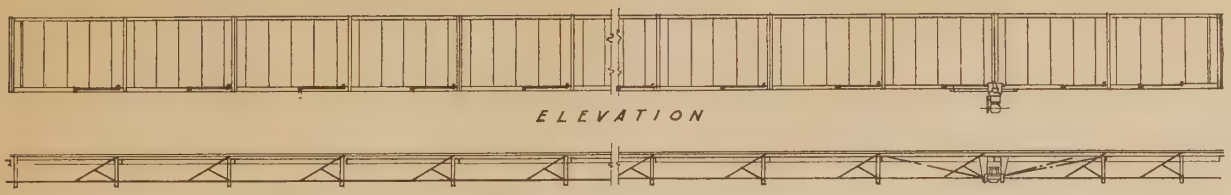
BRACKETS BOLTED TO SILL AND INTERMEDIATES, OR TRUSSES, BY CLIPS

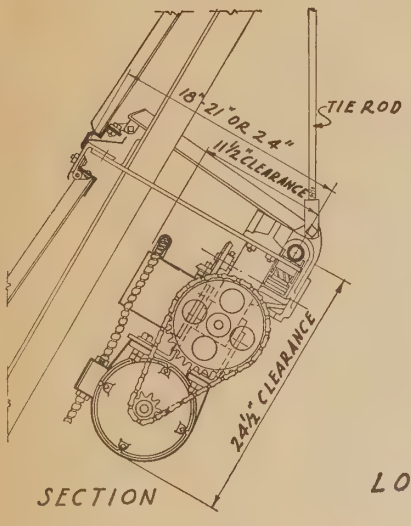

WINDOW DIM.
VERTICAL TENSION STRAP REQUIRED
NOTE:- EXTENSION BRACKET WITH CLIP TO SECURE WIDE BEARING THIS DETAIL USED ONLY IN CASES WHERE EXTENSION BRACKETS BETWEEN VERTICAL SUPPORTS ARE DESIRED. AS A RULE ALL EXTENSION BRACKETS SHOULD BE BOLTED TO SILL AND INTERMEDIATES OR TRUSS.
1 1/4"
4 1/2
CLIP

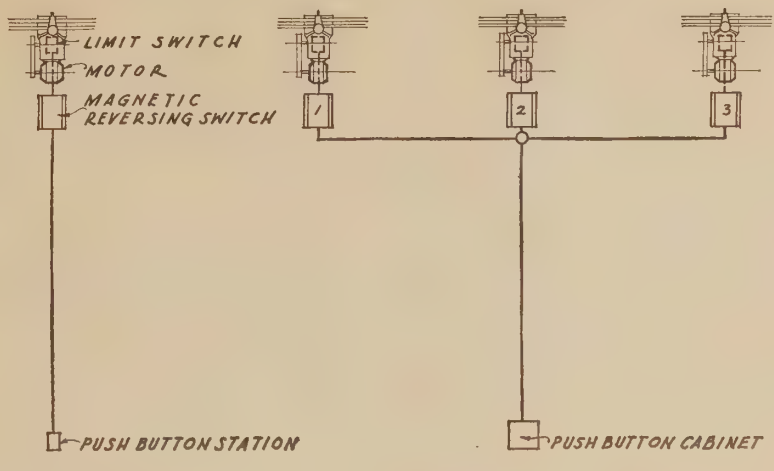
BRACKET BOLTED DIRECTLY TO SILL BETWEEN TRUSSES OR INTERMEDIATES

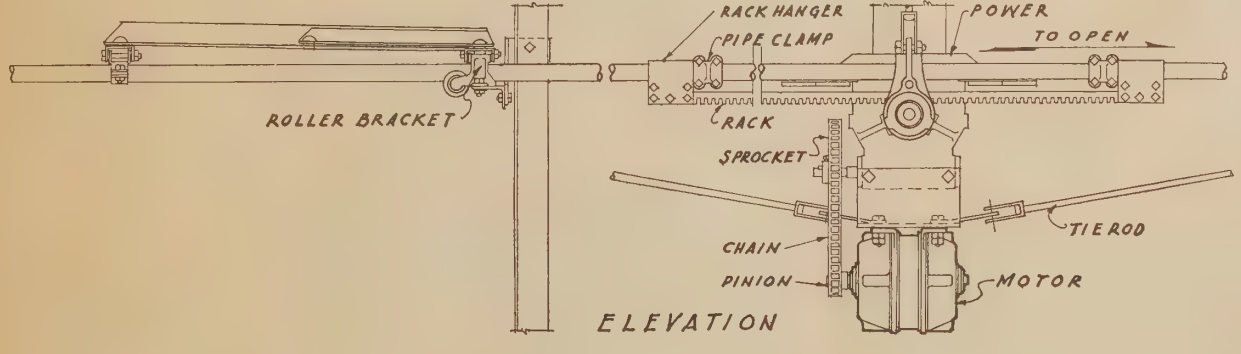
SCALE: HALF FULL SIZE

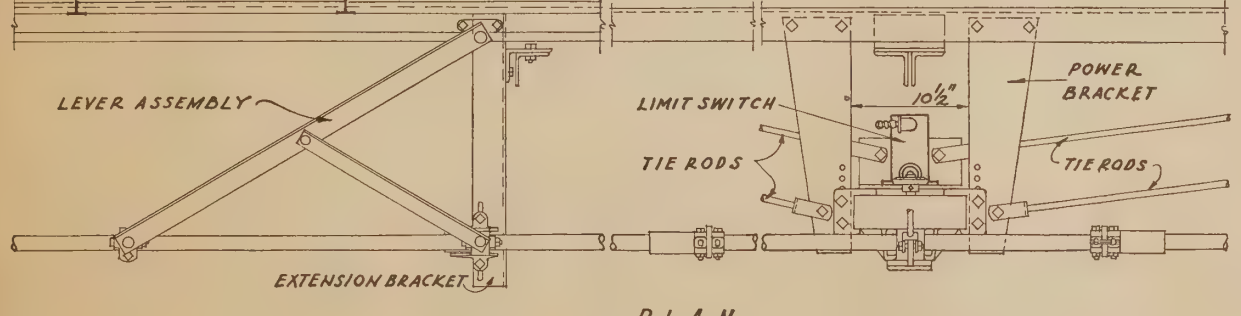
Fenestra, August 1927	Continuous Type Operator Extension Bracket Details	Plate No. S-503







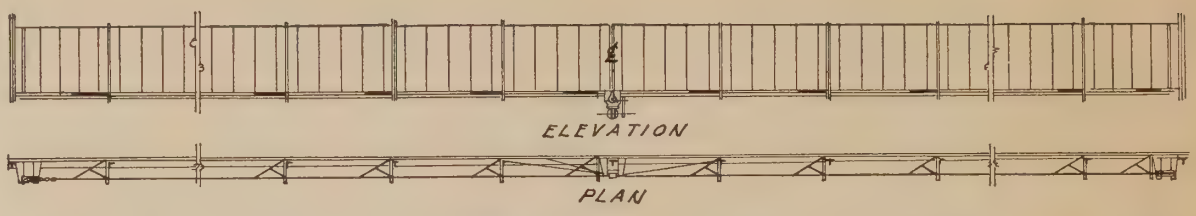


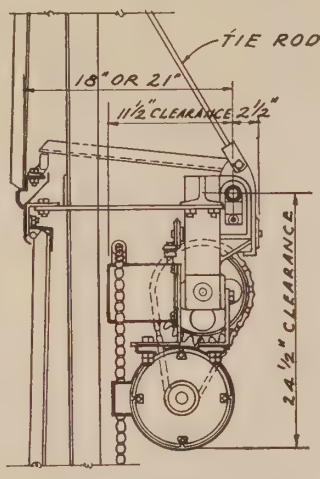


PLAN

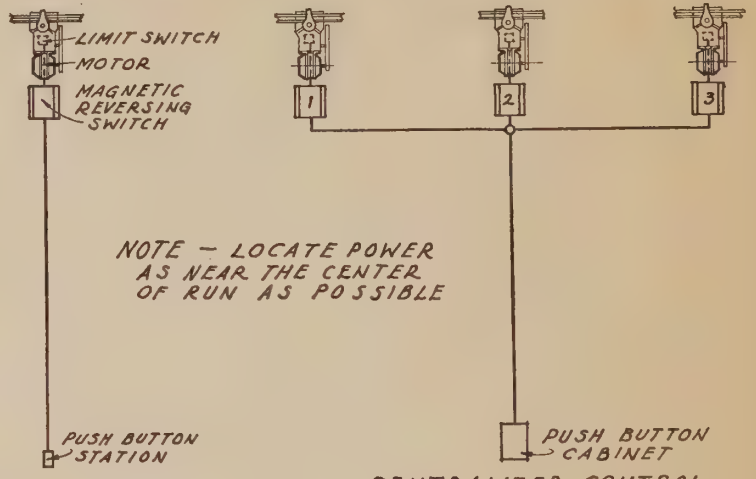
SCALE: ¾" = 1'-0"

Fenestra, August 1927	Continuous Type Operator Electrically Controlled	Plate No. S-504



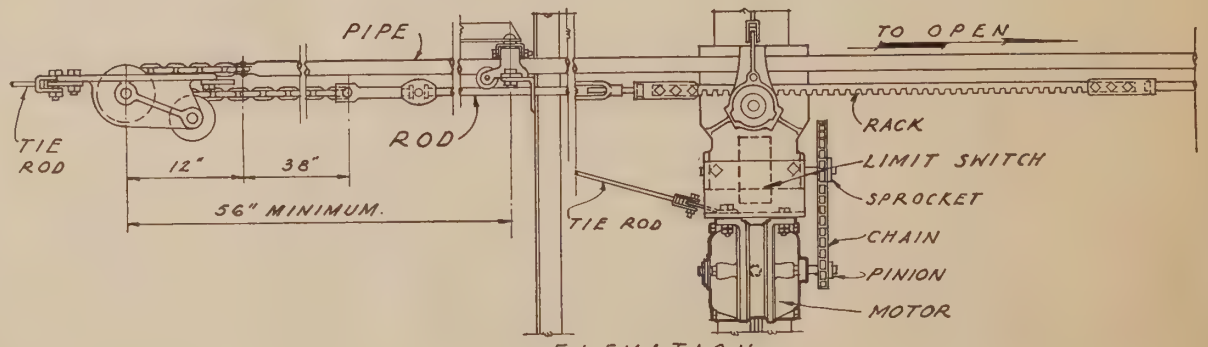


SECTION

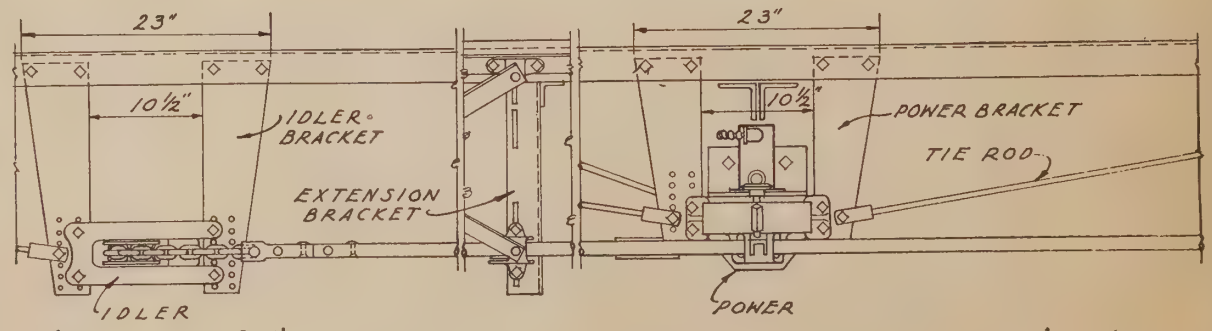


LOCAL CONTROL

CENTRALIZED CONTROL



ELEVATION



PLAN – SCALE: ¾" = 1'-0"

Fenestra August 1927	Continuous Cable Type Operator Electrically Controlled	Plate No S-505

(V) SWINGING AND SLIDING STEEL DOORS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications.

Note: Both Channel and Tubular doors are made to swing or slide and in single and double units. Specify as required.

(V-1) Work Included

Note: List and locate. See Paragraph 13, Fenestra Page 2.

Note: In lists or schedules, indicate whether swing doors open "In" or "Out" and which jamb carries the hinges.

(V-2) General

All doors shall be *Fenestra* (Channel) (Tubular) Steel Doors as manufactured by Detroit Steel Products Company.

Note: Specify whether Channel, Tubular or both.

(V-3) Materials

(V-3a) Door Frames, etc.—

Note: We strongly recommend that all door frames be included with the Miscellaneous Structural Steel or Ornamental Iron and that they be included under these or similar other specification divisions, for the reason that the frames in all cases should be installed when the building is erected to assure rigid anchorage. Steel doors, on the contrary, should be installed only after the building is erected.

Note: Provide, therefore, that all frames shall be made to the exact dimensions furnished by the Door Manufacturer and that they shall be erected plumb, true and rigidly anchored. Include provisions for slotted, sliding door thresholds and supports for sliding door tracks where these are required.

Note: Where particularly desired, 4" channel frames for swing doors only, will be furnished with the doors at added cost. If required, so specify. (See Fenestra Page 75.)

(V-3b) Door Panels—All sections shall be specially designed, hot rolled, solid steel bars with heavy fillets in all re-entrant angles.

All panel frame members shall be (equal leg channel) (angle) sections.

Note: Channels are used for channel doors and angles for tubular doors. Include either or both as required.

Muntins shall be 1⅝" deep. Solid panels shall be of 13 gauge steel.

(V-3c) Door Stiles and Rails—

(1) Door stiles and rails shall be of heavy rolled steel channels.

(2) Door stiles and rails shall be of heavy square steel tubing.

Note: Specify either or both as required.

(V-3d) Sliding Door Closure and Guide Plates and Meeting Stile Astragals—Closures and guides (and meeting stile astragals) shall be of heavy steel plates.

(V-4) Construction

(V-4a) Door Panels—All panel frames shall be mortise and tenon, air hammer riveted, at all corners. Muntins shall be continuous from bottom to top and from side to side, so interlocked at intersections as to increase the rigidity and strength—joints at frames shall be mortise and tenon air hammer riveted. Solid panels shall be secured by angles riveted to the panel frame and muntin members.

(V-4b) Channel Doors—Channel stiles and rails shall be butted together over solid corner castings, through riveted with countersunk rivets. Stiles and rails shall be riveted to frame of panel. Door stiles shall be reinforced with a steel plate at butts.

(V-4c) Tubular Doors—Tubular stiles and rails shall be mitered and butt welded at corners. Panel frames shall be attached to stiles and rails with countersunk machine screws.

(V-4d) Closures—Closure plates at top and back edges of sliding doors shall be attached with countersunk machine screws.

(V-4e) Guides and Astragals—Guide (and astragal) plates on the face of sliding doors shall be attached with countersunk through rivets.

(V-4f) Glazing Angles—All glass shall be secured with glazing angles, neatly mitered at angles. Angles shall be secured to frames with brass machine screws and to muntins with machine screws and nuts.

(V-4g) Hardware Provisions—Stiles, where required, shall be tapped to receive hardware attached at the time of erection.

(V-5) Attached Hardware

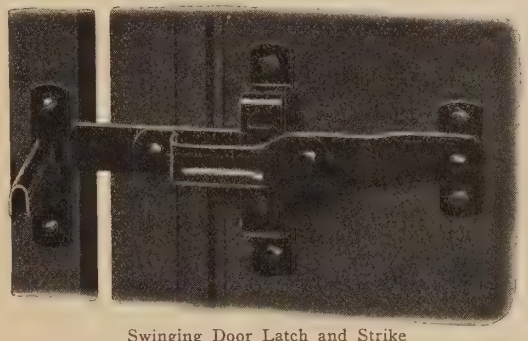
Note: Attached at factory.

(V-5a) Butts—All swinging doors shall be equipped with standard (4½"x4½") (6"x4½") steel butts with non-risable loose pins. The number of butts to each door shall be such as to adequately carry the weight.

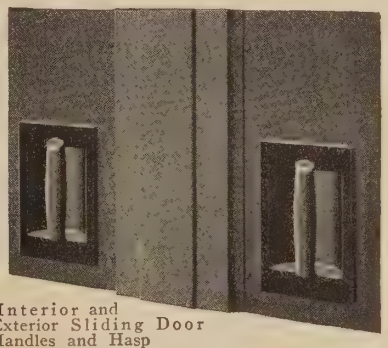
Note: 4½"x4½" butts are used on channel doors, 6"x4½" on tubular doors. Include either or both as required.

(V-5b) Latch-and-Locks—All swinging single doors shall be equipped with standard, bronze face, mortise latch-and-locks.

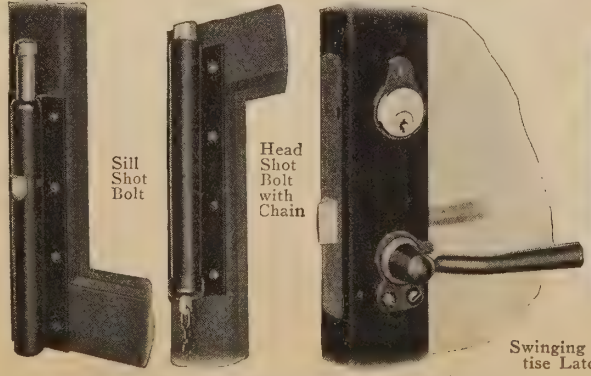
Fire Exit Panic Bolts

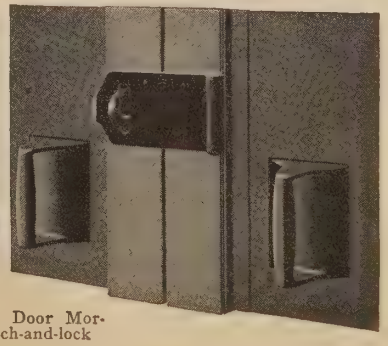


Swinging Door Latch and Strike



Interior and Exterior Sliding Door Handles and Hasp





Swinging Door Mortise Latch-and-lock

Swinging and Sliding Door Hardware

Note: Cylinders are installed after erection.
Note: Omit if surface Japanned iron latch and strike are selected. See (V-6b).

(V-5c) Sliding Door Handles—All sliding doors shall be equipped with combination flush and projecting iron handles, one to each door, solidly riveted to the steel panels.

(V-6) Detached Hardware

Note: See Fenestra Page 73.
Note: All detached hardware shall be shipped carefully packed to prevent damage till applied for use.

(V-6a) Swing Door Cylinders and Handles—All swing doors shall be equipped with malleable iron handles, and bronze faced cylinders and escutcheons.

Note: Use when latch-and-locks are included, see (V-5b). Where master keying is necessary, we prefer to key to our own system. If cylinder master keying is required, so specify here.

(V-6b) Swing Door Latches—All swinging doors shall be equipped with surface, Japanned iron door latches and strikes.

Note: Omit if mortised latch-and-locks are selected. See (V-5b) and (V-6a).

(V-6c) Shot Bolts—All fixed leaves of double swing doors shall be equipped with standard surface, spring shot bolts (Japanned iron case and steel bolts). Top bolt shall be chain operated. Bottom bolt shall be foot operated.

(V-6d) Sliding Door Hasps—All sliding doors shall be equipped with hinged hasps and staples.

(V-6e) Sliding Door Tracks—All sliding doors shall be equipped with standard steel tracks and adjustable roller bearing trucks, complete with track brackets.

(V-6f) Special Hardware—

Note: Special hardware, such as standard fire exit panic bolts, standard door checks, etc., will be furnished where desired. If required, so specify.

(V-7) Erection

(V-7a) All Steel Doors shall be erected by the Fenestra Construction Company under a separate contract.

Note: See Paragraph 5, Fenestra Page 1.

(V-7b) All doors shall be erected in a thoroughly workmanlike manner and left in perfect operating condition.

(V-7c) Apply all hardware in accordance with the manufacturer's directions.

(V-8) Painting

All Fenestra Steel Doors shall be given one dip-coat of red mineral paint by the manufacturer before shipment.

Note: The following should be provided for in the Painting Specifications:

One additional coat of paint should be applied after erection before glazing. Further painting should be deferred until at least three weeks after glazing to allow putty to set. One or more additional coats may then be applied as required.

Note: Where desired, the Fenestra Construction Company (see Paragraph 5, Fenestra Page 1) at reasonable added cost will do field painting after erection. If required, so specify here, including specification for paint and its application.

(V-9) Glass and Glazing

Note: The following should be included in the Glazing Specifications. See Paragraph 10, Fenestra Page 2.

(V-9a) Glass—Glass shall be ¼" thick, rough wire.

(V-9b) Putty—Putty shall be a high grade of steel window putty.

Note: Ordinary wood sash putty must not be used. See Paragraph 11, Fenestra Page 2.

(V-9c) Glazing—All glass shall be bedded in putty and secured with glazing angles.

Note: Do not paint until putty has thoroughly hardened. See note Paragraph (V-8).

(Y) INTERCHANGEABLE INDUSTRIAL PARTITIONS—Specifications

Notes are explanatory or advisory only and need not be included in the specifications.

Note: These partitions are adapted for use in warehouses, factories, mills, garages and the office portions of industrial buildings.

Note: To avoid repetition, where these specifications are identical to those for channel and tubular steel doors, this is so noted.

(Y-1) Work Included

Note: List and locate. (See Paragraph 13, Fenestra Page 1.)

(Y-2) General

All steel Industrial Partitions shall be *Fenestra* as manufactured by the Detroit Steel Products Company.

(Y-3) Material

(Y-3a) Window Units—All sections shall be specially designed, hot rolled, solid steel bars with heavy fillets in all re-entrant angles.

All frame members shall be equal leg channel sections.

Muntins shall be 1⅜" deep.

(Y-3b) Mullions and Door Frames—Each mullion shall be made of two 16 gauge formed steel plates, interlocked and punched for connections. Furnish malleable iron shoes for floor, ceiling and door head jamb connections. Door mullion shall be provided with butt reinforcing plates. Door head jambs shall be similar to mullions.

(Y-3c) Partition Ties—Partition Ties at top of window units shall be of 16 gauge formed steel plates, punched for mullion connections.

(Y-3d) Base Plates—Base plates shall be of 14 gauge steel.

(Y-3e) Filler Plates—Filler plates shall be of 24 gauge steel.

(Y-3f) Doors—Doors shall be formed with panels of window unit sections with special heavy rolled steel U channel stiles and rails. Glass shall be secured by glazing angles.

(Y-3g) Miscellaneous—Furnish all bolts, tap screws, etc., for connecting mullions and windows and door units together. Furnish angles or other means of attaching filler plates to building construction. Furnish expansion bolts where required.

(Y-4) Construction

(Y-4a) Window Units—All frames shall be mortise and tenon, air hammer riveted, at all corners. Muntins shall be continuous from head to sill and from jamb to jamb, so interlocked at intersections as to increase the rigidity and strength. Joints at frames shall be mortise and tenon air hammer riveted. Base plates shall be secured by angles riveted to the plate, frame and muntin members.

(Y-4b) Doors—Door panels shall be constructed like window units.

Note: Same as (V-4b).

(Y-5) Door Hardware

Note: Same as (V-5a), (V-5b), (V-6a), (V-6f) as applied to channel doors.

(Y-6) Erection

All steel Industrial Partitions shall be erected plumb and true, properly aligned and securely attached to the building construction. (Complete with all filler plates required.)

Note: If metal lath and plaster is substituted for filler plates, include this provision in the Lathing and Plastering Specifications.

Note: By loosening two mullions, any window unit may be removed or inserted without disturbing the rest of the partition. Units containing doors may be substituted for window units or vice versa.

Apply door hardware in accordance with manufacturer's directions.

Note: Units which contain doors are shipped "knocked down." In erecting door units, doors must always be hung from the mullion, which is reinforced to receive the butt screws.

Note: Where desired, the Fenestra Construction Company (see Paragraph 5, Fenestra Page 1) at reasonable added cost will erect steel Industrial Partitions. If required, so specify here.

(Y-7) Painting

Note: Same as (V-8).

(Y-8) Glass and Glazing

Note: The following should be included in the Glazing Specifications. (See Paragraph 10, Fenestra Page 2.)

Glass—Glass shall be (¼" thick plate) (double strength).

Note: Single strength glass is not recommended.

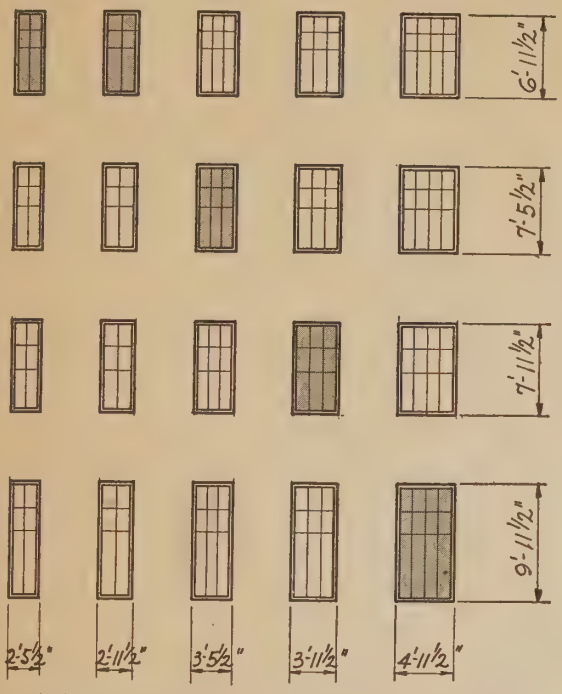
Putty—Putty shall be a high grade of steel window putty.

Note: Ordinary wood sash putty must not be used. See Paragraph 11, Fenestra Page 2.

Glazing—All glass in window units shall be set in a bed of putty and secured by copper plated, steel, spring glazing clips furnished by the Partition Manufacturer. (4 clips for each light.) Face putty shall be applied in a neat, clean-cut, smooth manner.

Glass in doors shall be bedded in putty and secured with glazing angles.

Note: Do not paint until putty has thoroughly hardened. See note Paragraph (V-8).

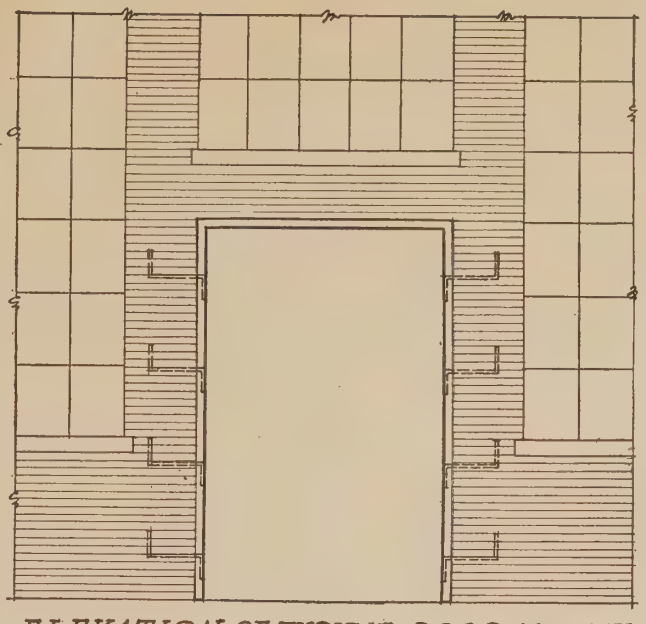


• STANDARD • AND • STOCK • TYPES •

TYPES SHOWN SHADED ARE CARRIED IN STOCK

NOTE - THE ABOVE UNITS WILL BE MADE WITH CHANNEL TRIM AND CAN BE USED FOR EITHER SWING OR SLIDING DOORS.

DIMENSIONS SHOWN ARE OVERALL DOOR SIZES WITH OPENING CLEARANCES DEDUCTED. FOR CLEARANCES SEE PLATE NO. V-102.



• ELEVATION • OF • TYPICAL • DOOR • FRAME •

NOTE - STANDARD DOOR FRAMES FOR SWING DOORS ONLY ARE MADE OF 4" STRUCTURAL STEEL CHANNEL AND ARE EQUIPPED WITH HEAVY ZEE ANCHORS ON EACH SIDE SPACED ABOUT 2'-0" ON CENTERS TO ANCHOR FRAME INTO THE MASONRY. HOLES IN FRAME FOR HINGES ARE DRILLED AND TAPPED IN SHOP TO MATCH DOORS.

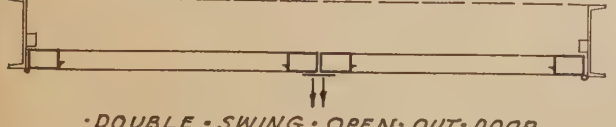
FRAMES FOR SINGLE DOORS ARE SHIPPED ASSEMBLED, USING AN ANGLE TIE ACROSS THE BOTTOM. FRAMES FOR DOUBLE DOORS ARE SHIPPED KNOCKED DOWN AND MUST BE BOLTED TOGETHER IN FIELD.

• SWING • DOORS •

• LEFT • HAND • OPEN • IN • DOOR • • RIGHT • HAND • OPEN • IN • DOOR •

• LEFT • HAND • OPEN • OUT • DOOR • • RIGHT • HAND • OPEN • OUT • DOOR •

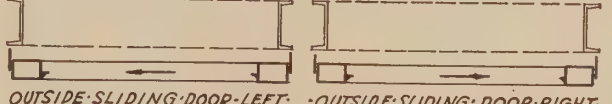
• DOUBLE • SWING • OPEN • IN • DOOR •



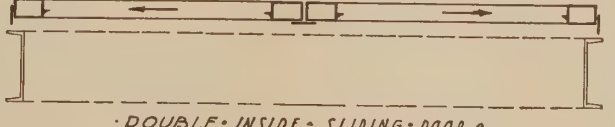
• DOUBLE • SWING • OPEN • OUT • DOOR •

• SLIDING • DOORS •

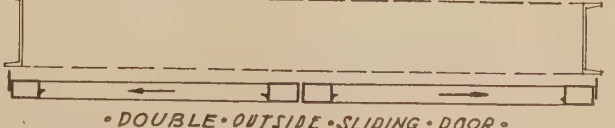
• INSIDE • SLIDING • DOOR - LEFT • • INSIDE • SLIDING • DOOR - RIGHT •



• OUTSIDE • SLIDING • DOOR • LEFT • • OUTSIDE • SLIDING • DOOR • RIGHT •



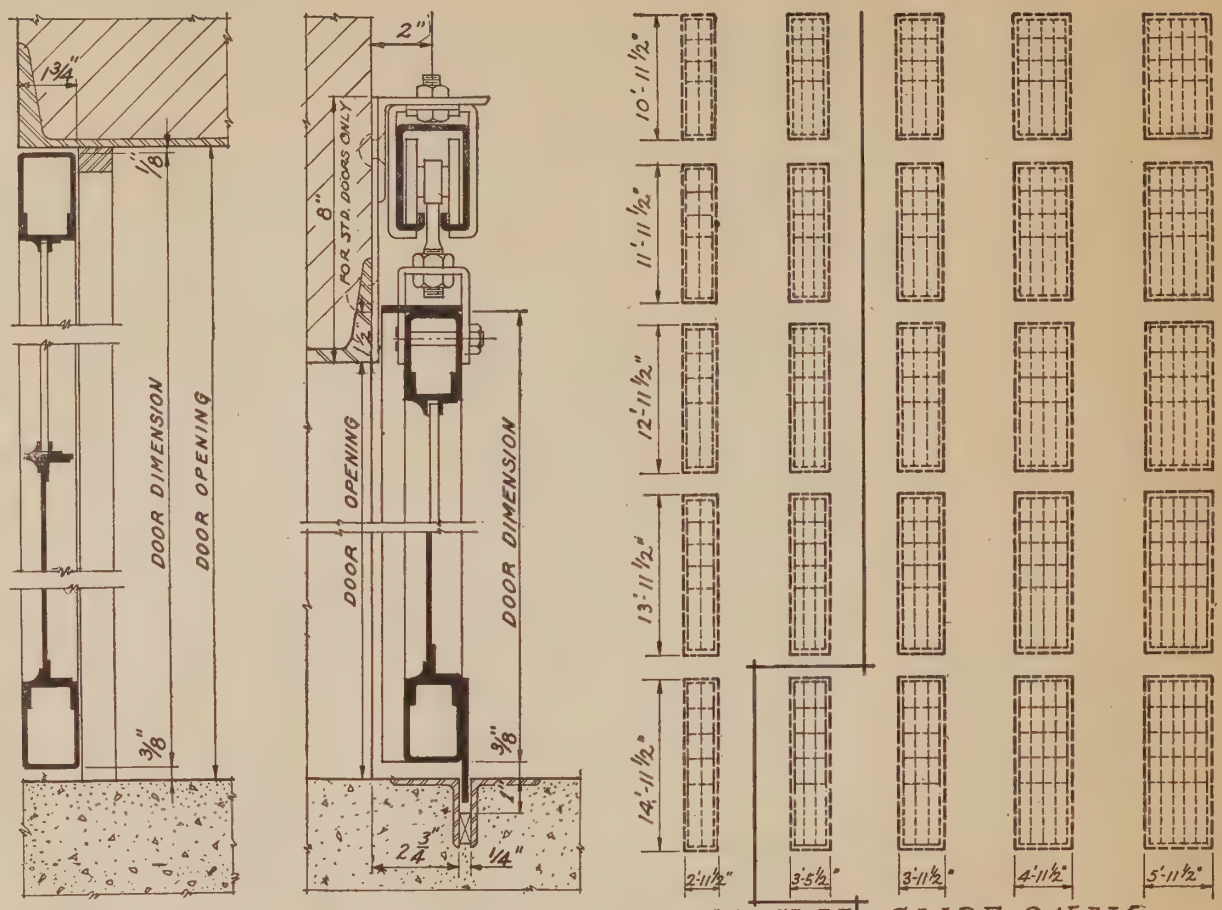
• DOUBLE • INSIDE • SLIDING • DOOR •



• DOUBLE • OUTSIDE • SLIDING • DOOR •

• DESIGNATION • OF • DOORS •

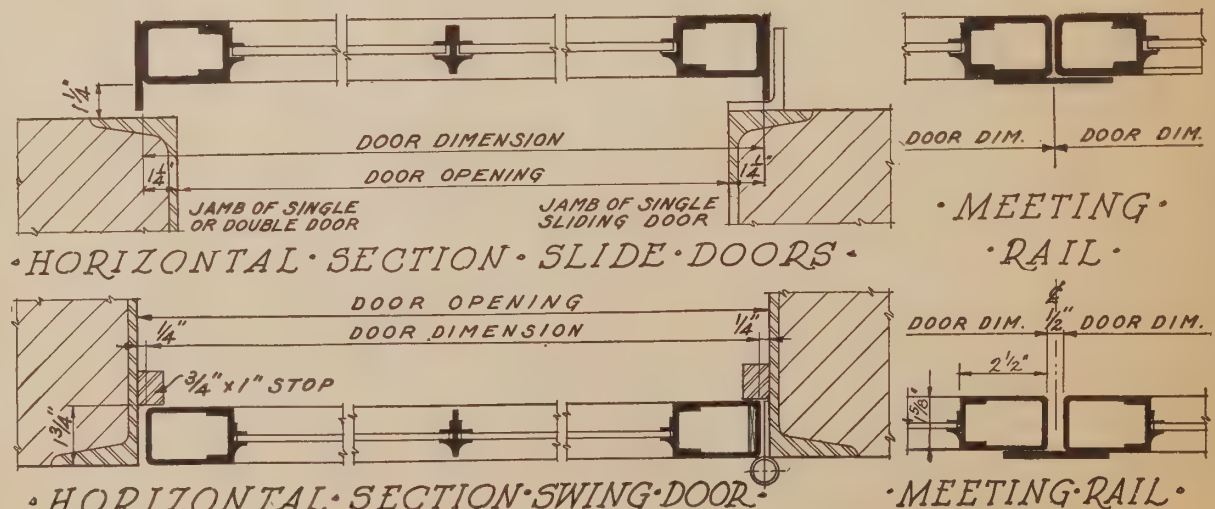
Fenestra August 1927	*Swinging and Sliding Doors* *Types, Sizes and Handing*	**Plate No** V-101



·VERTICAL·SEC·
·SWING·DOOR·

·VERTICAL·SEC·
·SLIDING·DOOR·

SWING OR SLIDE | SLIDE ONLY
·LISTED·SPECIAL·TYPES·



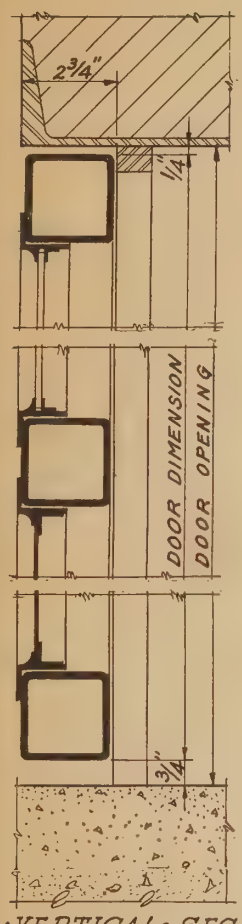
·HORIZONTAL·SECTION·SLIDE·DOORS·

·MEETING·
·RAIL·

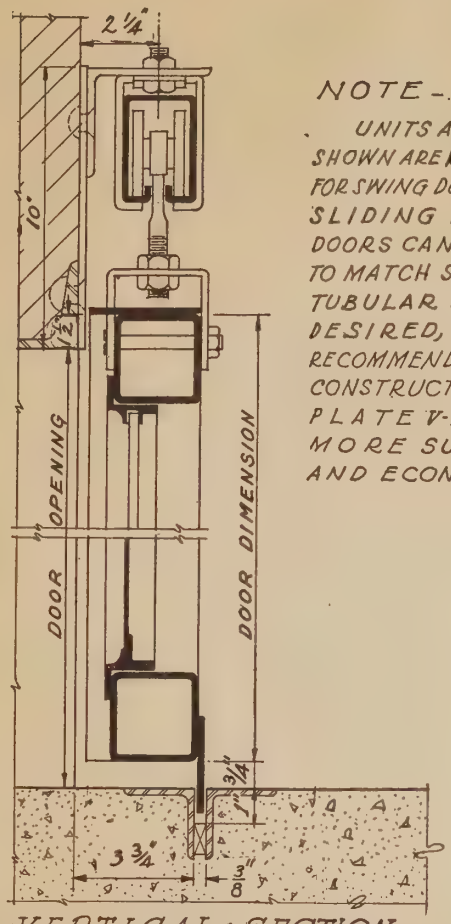
·HORIZONTAL·SECTION·SWING·DOOR·

·MEETING·RAIL·

Fenestra *August 1927*	*Swinging and Sliding Doors* *Typical Channel Doors*	**Plate No** *V-102*



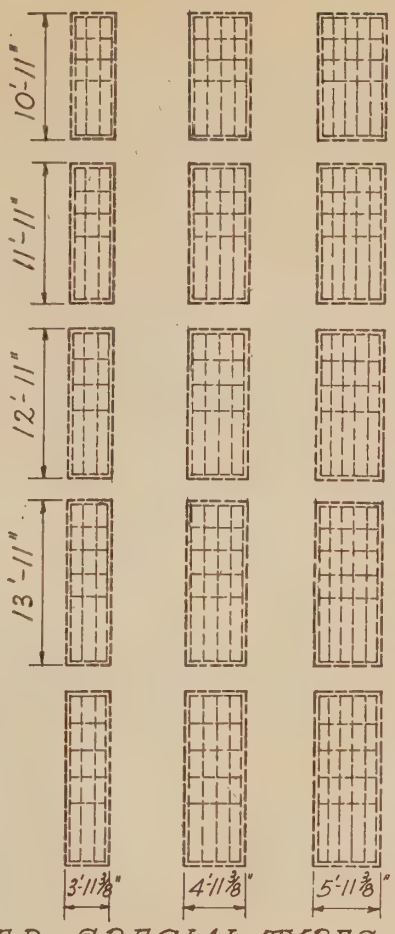
·VERTICAL· SEC. ·SWING·DOOR·



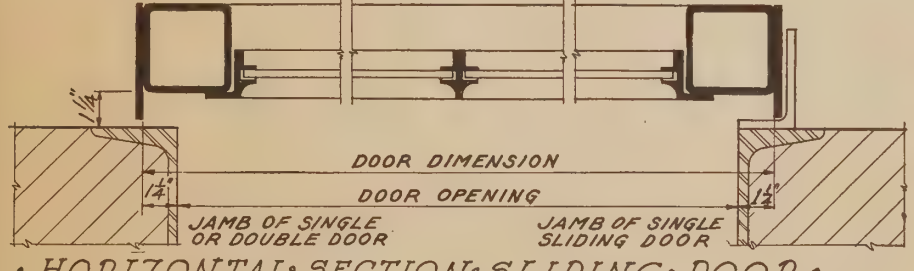
·VERTICAL· SECTION· ·SLIDING·DOOR·

NOTE-:

UNITS AND DETAILS SHOWN ARE RECOMMENDED FOR SWING DOORS ONLY SLIDING TUBULAR DOORS CAN BE MADE TO MATCH SWINGING TUBULAR DOORS, IF DESIRED, BUT WE RECOMMEND A LIGHTER CONSTRUCTION (SEE PLATE V-102) AS MORE SUITABLE AND ECONOMICAL.

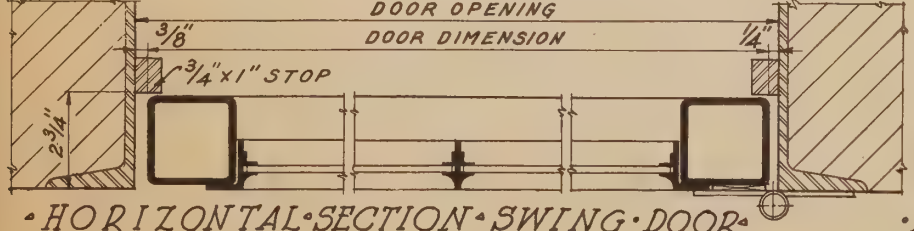


·LISTED·SPECIAL·TYPES·

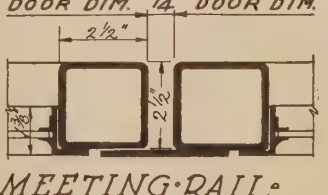


·HORIZONTAL·SECTION·SLIDING·DOOR·

·MEETING· ·RAIL·



·HORIZONTAL·SECTION·SWING·DOOR·

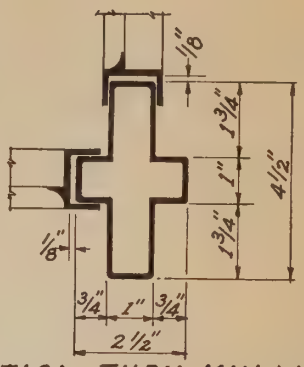


·MEETING·RAIL·

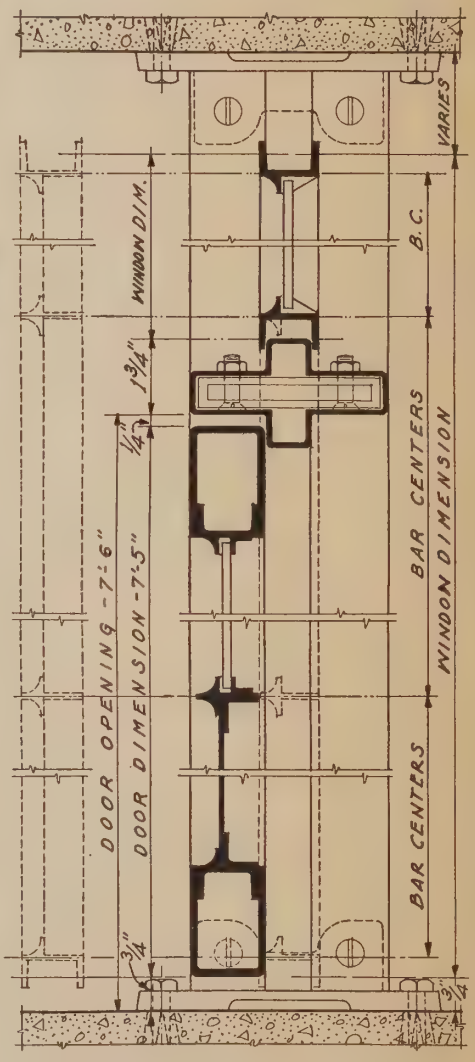
Fenestra August 1927	Swinging and Sliding Doors Typical Tubular Doors	Plate No V-103

EXCEPT FOR DOORS ALL GLASS IS 18"x26"

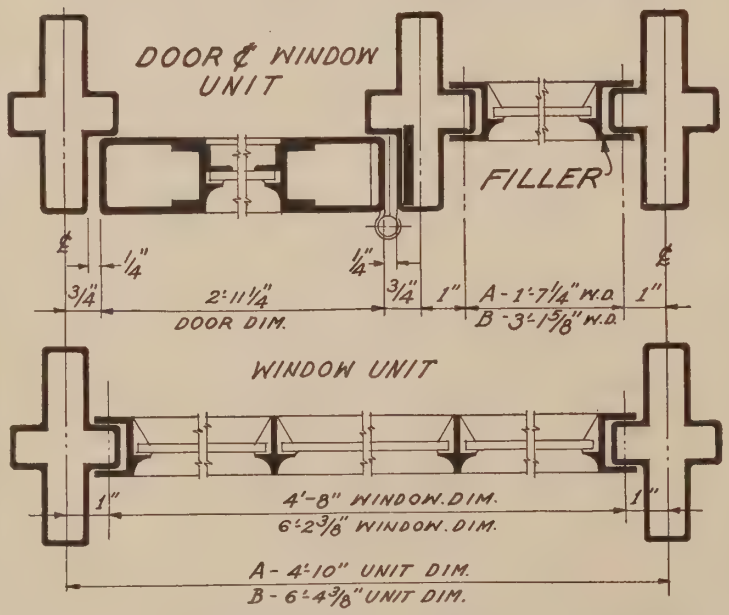
TYPES AND SIZES OF PARTITION UNITS



SECTION THRU MULLION



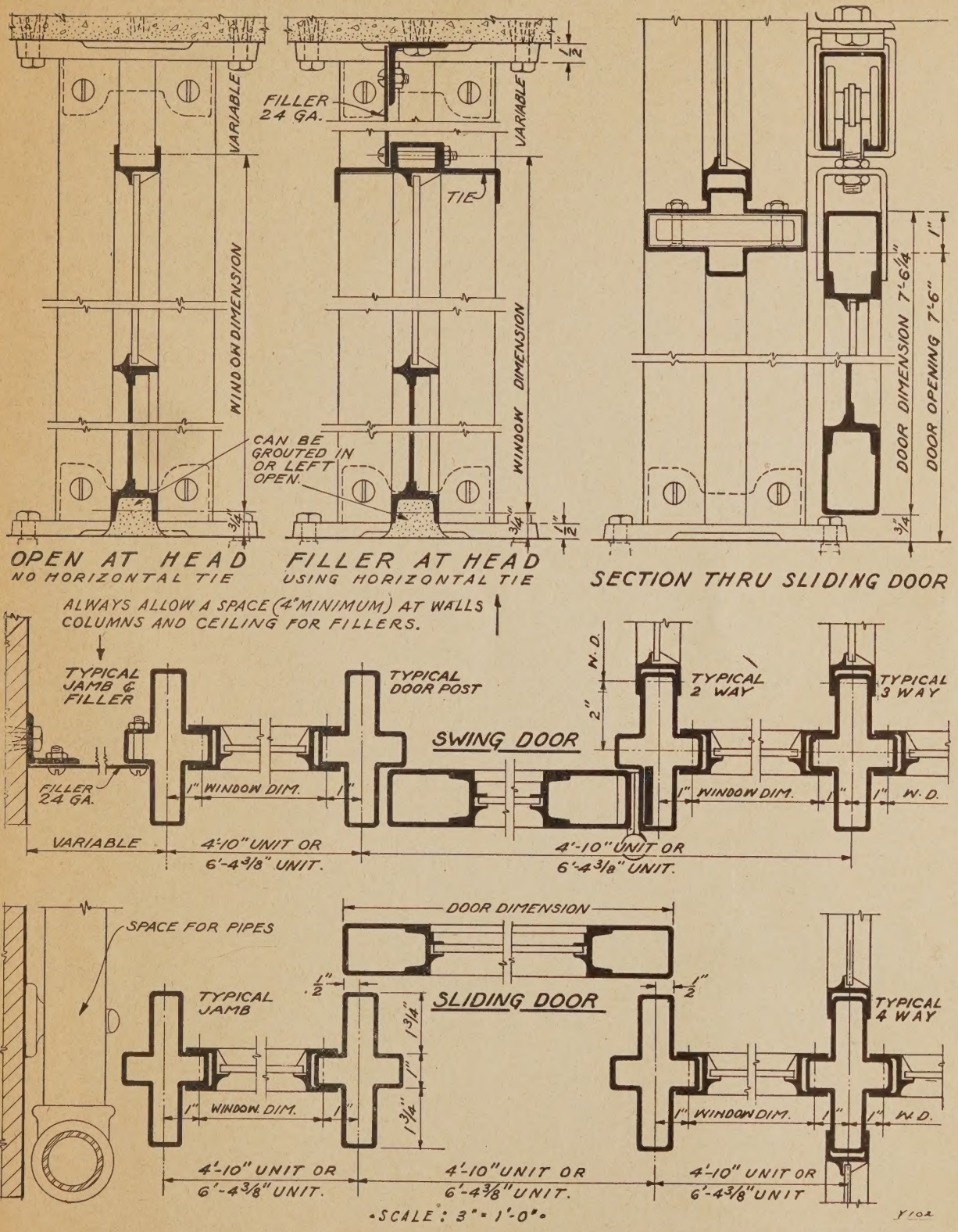
VERTICAL SECTION AT DOOR
SHOWING RELATION OF BAR CENTERS.



PLAN OF INTERCHANGEABLE UNITS

• SCALE : 3" = 1'-0" •

Fenestra *August 1927*	*Interchangeable Partitions* *Types, Sizes and Details*	**Plate No** *Y-101*



Fenestra, August 1927	Interchangeable Partitions Typical Cross Sections	Plate No. Y-102

Airplane Hangar Doors

Fenestra Airplane Hangar Doors offer a quick, easy and simple method of opening or closing large door openings.

Stiles and rails are made from hot-drawn 4x2½ in. seamless, steel tubing, and are mitered, butt welded and heavily reinforced at every corner. Special Fenestra, hot rolled, solid steel sections are used to frame the glass panels, glass being held by bed putty and glazing angles. Solid panels are of 11-gauge steel, and are double—one on each side.

All doors rest on double flanged, cast steel wheels designed to roll on steel tracks which carry the entire weight of the doors. Each wheel is mounted in a cast steel housing equipped with a roller swivel and ball bearings.

Bronze bushed steel rollers, attached to the head rail of each door, serve as guides, reduce friction and minimize the transverse load on structural steel members.

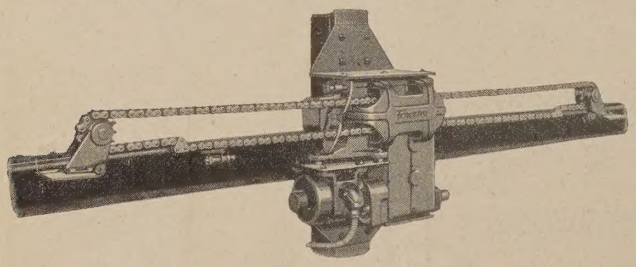
Suitable locking hardware, such as cane bolts, etc., is supplied and, to make manual operation easy, a hand hole is recessed into each door panel. Weathering is accomplished by means of ⅛x4½ in. rubber strips between doors.

Due to shipping limitations, the usual dimensions of these doors are 8x20 ft. but other sizes can be made as specified. Any number of doors can be used on parallel tracks approximately 6 in. apart to fill any width of opening.

Hinged pilot doors can be supplied when specified. As with other Fenestra products, erection and field painting will be handled by FENESTRA CONSTRUCTION COMPANY under separate contract, at reasonable added cost. Sixty-four of these doors, installed in 1926 at the Ford Airport, Fordson, Michigan, have been the subject of admiring comment on the part of aviators on account of their unusually easy operation.

Super-Power Operator

For exceptionally large industrial buildings where unusual operating service is desired on long runs of continuous top hung windows, we are prepared to supply the Fenestra Super-power which, in connection with continuous operator transmission line and lever arms, will handle conveniently top hung continuous windows in runs up to 600 ft.



The Fenestra Super-Power Operator

The utmost care has been used both in workmanship and materials to produce a device that combines smooth, even, efficient action with superlative strength and durability.

The power consists of a heavy, double, spur gear reduction of especially heat treated alloy steel and a case hardened steel worm engaging a heavy, special alloy, non-ferrous bronze, worm gear. Shafts for all spur gears are of heat treated alloy steel with generously proportioned bearings. The worm shaft has, in addition, combination radial and thrust bearings of ball bearing type. The entire mechanism is enclosed in an accurately machined oil-tight case.

The power is usually located in the center of the run, operating a transmission line on either side through a heavy, continuous, roller type, chain drive. The motor is direct connected to the power by means of spur gears.

Conditions demanding the use of this super equipment are unusual. We strongly recommend consultation with Fenestra engineers who will be glad to make suggestions without obligation.

Underwriters' Windows

In most buildings, standard Fenestra steel windows afford ample fire protection. Under certain conditions, however, types carrying the label of the Underwriters' Laboratories, Inc., are desirable or required.

Underwriters' windows are limited to 7x12 ft., either dimension being taken as height or width.

Multiple units may be used to any width of opening by the use of the standard Fenestra T-bar mullion between units, provided the width between mullions does not exceed 7 ft.

¼ in. wire glass must be used, each light being limited in width to 14 in. and in height to 48 ft. and an exposed area of 350 sq. in. Glass to be held by $\frac{5}{8}$x$\frac{7}{16}$ in. 16-gauge, pressed steel angles tapped to outside ventilator bars and bolted through interior muntins. Exposed glass area is measured from toe to toe of the glazing angles.

At added cost, the following types of Fenestra windows can be furnished with the Underwriters' label:

Standard and listed special types of horizontally pivoted windows (see Fenestra page 38) pivoted either 2 in. above center or 4 in. from the top.

Standard and listed special types of commercial projected windows (see Fenestra page 28) except those types which contain one or more open-in ventilators.

Standard and listed special types of architectural projected windows (see Fenestra page 20) by insertion of muntin bars in ventilators as necessary to meet glass limitations—*except* those types which include one or more open-in ventilators.

Counterbalanced windows, by the insertion of vertical and horizontal muntins in ventilators as necessary to meet glass limitations. All ventilators are limited in area to 30 sq. ft.

Each horizontally pivoted ventilator must be operated separately, either with standard cam handle and stay or cam handle and chain except those pivoted 4 in. from the top where cam and stay must be used. Standard Fenestra iron hardware on projected and counterbalanced types will be satisfactory.

Power and Auxiliary Power

The Fenestra Power and Auxiliary Power are designed for use on any tension operator where it is desired to operate several banks or runs of sash, one above another, from the same power station. Naturally it is used chiefly with continuous operator and is equally applicable to either manual or electrical control.

The device consists of a steel pinion which moves with the main power and which is connected through a steel shaft with universal joints, to a similar pinion in mesh with a rack on each of the other runs of windows. Thus the several pinions move in unison causing the tension lines on the various runs to act simultaneously.

The width of opening and the number and length of runs naturally vary with the requirements of the job.

Special Door Designs

Occasionally we are asked to solve some special door problem which arises in connection with buildings of unusual or peculiar design and our engineers are always glad to cooperate on such requests.

A typical example of this service was the design and manufacture of 20 Fenestra vertically sliding doors for the Detroit Seamless Steel Tube Company. These doors were operated by a worm and gear device connected by means of a steel shaft to pulleys over which the doors were counterbalanced against counter-weights.

APR 29 CLASSICS

Printed in U.S.A.
By Anchor Press Inc.
Detroit

Fenestra

for all industrial structures
commercial buildings
schools and institutions
homes and apartments

Detroit Steel Products Company
2250 East Grand Boulevard
Detroit, Michigan